

RAPID

MATHS



Part

6

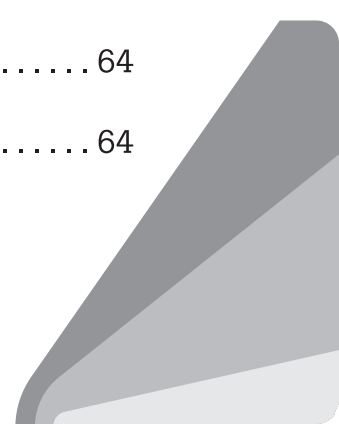
Teacher's Help Book (6-8)





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SOLUTIONS

1

Knowing Our Numbers

⇒ EXERCISE 1.1

1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. Given in answersheet.
5. Given in answersheet.
6. (a) $80000 - 80 = 79920$
(b) $7000 - 7 = 6993$
(c) $3000000 - 3 = 2999997$
(d) $50000000 - 500 = 49999500$
7. (a) $50000 + 50 = 50050$
(b) $7000 + 70 = 7070$
(c) $60000 \div 6 = 60000$
(d) $900000 + 9 = 900009$
8. Given in answersheet
9. Given in answersheet.
10. Given in answersheet.

⇒ EXERCISE 1.2

1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. Given in answersheet.
5. Given in answersheet.
6. Given in answersheet.
7. Given in answersheet.
8. Given in answersheet.
9. 8-digit largest no = 99999999
8-digit smallest no = 10000000
So, all 8-digit numbers
 $= (99999999 - 10000000) + 1 = 90000000$
10. 5-digit largest no = 99999
5-digit smallest no = 10000
So, all 5-digit numbers
 $= (99999 - 10000) + 1 = 90000$

⇒ EXERCISE 1.3

1. Number of wheat bags = 1785694
Number of rice bags = 548769
Number of sugar bags = 45983
So, total bags = $1785694 + 548769 + 45983$
 $= 2380446$

2. Total population = 48967851
Number of illiterate = 5698541
So, number of literate = $48967851 - 5698541$
 $= 43269310$
3. Profit in year 2017 = ₹ 1, 28, 59, 654
Profit increases in year 2018 = ₹ 5, 60, 450
So, total profit in year 2018
 $= ₹ 1,28,59,654 + ₹ 5,60,450 = ₹ 1,34,20,104$
4. Population in year 2017 = 3,26,58,960
Population in next year = 3,27,59,450
So, increase in population
 $= 3,27,59,450 - 3,26,58,960 = 1,00,490$
5. A man had money = ₹ 45,61,490
Given to wife = ₹ 18,45,300
Given to son = ₹ 10,14,000
Total given money = ₹ 1845300
 $+ ₹ 1014000$
 $= ₹ 2859300$
So, left money which is given to daughter
 $= ₹ 4561490 - ₹ 2859300$
 $= ₹ 1702190$
6. Cost of one computer = ₹ 29,850
So, cost of 385 computers = ₹ (29850×385)
 $= ₹ 11492250$
7. Cost of one LCD = ₹ 74500
So, cost of 55 LCDs = ₹ (74500×55)
 $= ₹ 4097500$
8. Fare of 48 tickets = ₹ 60,384
So, fare of one ticket = ₹ $(60384 \div 48)$
 $= ₹ 1258$
9. Amount needed in 20 years = ₹ 20,45,600
So, amount needed in one year = ₹ $(2045600 \div 20)$
 $= ₹ 102280$
10. Product of two numbers = 44895
One of them = 123
So, other number = $44895 \div 123 = 365$
11. Difference = $7486349 - 416859 = 7069490$
12. Difference = $569245 - 423689 = 145556$
13. Required number = $500000 - 456384$
 $= 43616$
14. Required number = $1389654 - 1376948 = 12706$
15. Required number = $7454286 - 7325961 = 128325$
16. Required number = $580000 - 576453 = 3547$

⇒ EXERCISE 1.4

1. (a) $48 + 63 + 18$
Estimated sum = $50 + 60 + 20 = 130$
- (b) $49 + 61 + 35$
Estimated sum = $50 + 60 + 40 = 150$
- (c) $914 + 613 + 46$
Estimated sum = $910 + 610 + 50 = 1570$
- (d) $728 + 546 + 378$
Estimated sum = $730 + 550 + 380 = 1660$
- (e) $168 + 243 + 164$
Estimated sum = $170 + 240 + 160 = 570$
- (f) $458 + 675 + 113$
Estimated sum = $460 + 680 + 110 = 1250$
2. (a) $163 + 346 + 148$
Estimated sum = $200 + 300 + 100 = 600$
- (b) $1963 + 2046$
Estimated sum = $2000 + 2000 = 4000$
- (c) $412 + 3189$
Estimated sum = $400 + 3200 = 3600$
- (d) $920 + 386 + 156$
Estimated sum = $900 + 400 + 200 = 1500$
- (e) $1846 + 386$
Estimated sum = $1800 + 400 = 2200$
- (f) $118 + 358 + 567$
Estimated sum = $100 + 400 + 600 = 1100$
3. (a) $3167 + 4856$
Estimated sum = $3000 + 5000 = 8000$
- (b) $4186 + 9826$
Estimated sum = $4000 + 10000 = 14000$
- (c) $7865 + 4005$
Estimated sum = $8000 + 4000 = 12000$
- (d) $5136 + 5648$
Estimated sum = $5000 + 6000 = 11000$
- (e) $7116 + 4226$
Estimated sum = $7000 + 4000 = 11000$
- (f) $9428 + 3569$
Estimated sum = $9000 + 4000 = 13000$
4. (a) $254 - 148$
Estimated difference = $250 - 150 = 100$
- (b) $158 - 48$
Estimated difference = $160 - 50 = 110$
- (c) $4186 - 4137$
Estimated difference = $4190 - 4140 = 50$
- (d) $198 - 146$
Estimated difference = $200 - 150 = 50$

- (e) $1263 - 768$
Estimated difference = $1260 - 770 = 490$
- (f) $629 - 248$
Estimated difference = $630 - 250 = 380$
5. (a) $918 - 178$
Estimated difference = $900 - 200 = 700$
- (b) $7183 - 4164$
Estimated difference = $7200 - 4200 = 3000$
- (c) $8964 - 5432$
Estimated difference = $9000 - 5400 = 3600$
- (d) $1458 - 1263$
Estimated difference = $1500 - 1300 = 200$
- (e) $5236 - 1587$
Estimated difference = $5200 - 1600 = 3600$
- (f) $6428 - 2189$
Estimated difference = $6400 - 2200 = 4200$
6. (a) $51368 - 3798$
Estimated difference = $51000 - 4000 = 47000$
- (b) $7298 - 4456$
Estimated difference = $7000 - 4000 = 3000$
- (c) $41569 - 4182$
Estimated difference = $42000 - 4000 = 38000$
- (d) $26258 - 9163$
Estimated difference = $26000 - 9000 = 17000$
- (e) $71258 - 3748$
Estimated difference = $71000 - 4000 = 67000$
- (f) $5648 - 3168$
Estimated difference = $6000 - 3000 = 3000$

⇒ EXERCISE 1.5

1. (a) 57×62
Estimated product = $60 \times 60 = 3600$
- (b) 31×46
Estimated product = $30 \times 50 = 1500$
- (c) 146×36
Estimated product = $150 \times 40 = 6000$
2. (a) 816×384
Estimated product = $800 \times 400 = 320000$
- (b) 374×128
Estimated product = $400 \times 100 = 40000$
- (c) 456×618
Estimated product = $500 \times 600 = 300000$
3. (a) 7196×8145
Estimated product = $7000 \times 8000 = 56000000$
- (b) 9281×5236
Estimated product = $9000 \times 5000 = 45000000$

(c) 3781×4861
 Estimated product = $4000 \times 5000 = 20000000$

4. (a) $828 \div 36$
 Estimated quotient = $800 \div 40 = 20$
 (b) $9752 \div 39$
 Estimated quotient = $9800 \div 40 = 245$
 (c) $9279 \div 28$
 Estimated quotient = $9000 \div 30 = 300$
 (d) $6784 \div 52$
 Estimated quotient = $7000 \div 50 = 140$
 (e) $9168 \div 26$
 Estimated quotient = $9000 \div 30 = 300$
 (f) $6576 \div 42$
 Estimated quotient = $7000 \div 40 = 175$

5. Given in answersheet.
 6. Given in answersheet.

➤ **EXERCISE 1.6**

1. (a) $18 = 10 + 5 + 3 = \text{XVIII}$
 (b) $54 = 50 + 4 = \text{LIV}$
 (c) $37 = 10 + 10 + 10 + 5 + 2 = \text{XXXVII}$
 (d) $43 = 40 + 3 = \text{XLIII}$
 (e) $93 = 90 + 3 = \text{XCIII}$
 (f) $99 = \text{IC}$
 (g) $135 = 100 + 30 + 5 = \text{CXXXV}$
 (h) $341 = 300 + 40 + 1 = \text{CCCXLI}$
 (i) $195 = 100 + 90 + 5 = \text{CXC V}$
 (j) $475 = 400 + 50 + 20 + 5 = \text{CDLXXV}$
 (k) $612 = 600 + 10 + 2 = \text{DCXXII}$
 (l) $783 = 500 + 200 + 50 + 30 + 3 = \text{DCCLXXXIII}$
 (m) $815 = 500 + 300 + 10 + 5 = \text{DCCCXV}$
 (n) $915 = 900 + 10 + 5 = \text{CMXV}$
 (o) $516 = 500 + 10 + 6 = \text{DXVI}$
 (p) $768 = 500 + 200 + 50 + 10 + 5 + 3 = \text{DCCLXVIII}$
2. (a) $\text{XLV} = 40 + 5 = 45$
 (b) $\text{DVI} = 500 + 6 = 506$
 (c) $\text{LXXXIV} = 50 + 30 + 4 = 84$
 (d) $\text{DXCVII} = 500 + 90 + 5 + 2 = 597$
 (e) $\text{CDVII} = 400 + 5 + 2 = 407$
 (f) $\text{CLIV} = 100 + 50 + 4 = 154$
 (g) $\text{XCII} = 90 + 2 = 92$
 (h) $\text{DCXXVII} = 500 + 100 + 20 + 5 + 2 = 627$
 (i) $\text{CDXLVI} = 400 + 40 + 5 + 1 = 446$
 (j) $\text{XCIX} = 90 + 9 = 99$
 (k) $\text{CXII} = 100 + 10 + 2 = 112$
 (l) $\text{CDXIV} = 400 + 10 + 4 = 414$
 (m) $\text{DCCLXVI} = 500 + 200 + 50 + 10 + 6 = 766$

- (n) $\text{LXXV} = 50 + 20 + 5 = 75$
 (o) $\text{CCCLXIX} = 300 + 50 + 10 + 9 = 369$
 (p) $\text{CDXLVII} = 400 + 40 + 5 + 2 = 447$

➤ **HOTS**

1. Given in answersheet.
 2. Given in answersheet.
 3. Place value of 8 at ninth place = 800000000
 Face value of 8 = 8
 Difference = $800000000 - 8 = 79,99,99,972$
 4. $\text{CXVI} + \text{XIII} + \text{VI} + \text{CCC LXV}$
 $= 116 + 13 + 6 + 365 = 500 = \text{D}$

➤ **NCERT CORNER**

1. Given in answersheet.
 2. (a) 8,75,95,762
 Eight crore seventy-five lakh ninety-five thousand seven hundred sixty two
 (b) 85,46,283
 Eighty-five lakh forty-six thousand two hundred eighty-three
 (c) 9,99,00,046
 Nine crore ninety-nine lakh forty six
 (d) 9,84,32,701
 Nine crore eighty-four lakh, thirty-two thousand seven hundred one
3. (a) 78,921,092
 Seventy-eight million, nine hundred twenty-one thousand, ninety-two
 (b) 7,452,283
 Seven million four hundred fifty-two thousand two hundred eighty-three
 (c) 99,985,102
 Ninety-nine million nine hundred eighty-five thousand one hundred two
 (d) 48,049,831
 Forty-eight million forty-nine thousand eight hundred thirty one
4. (a) $730 + 998 \Rightarrow 730 \rightarrow 700; 998 \rightarrow 1,000$
 (Rounding to hundreds)
 \therefore Estimated sum = $700 + 1000 = 1700$
 (b) $796 - 314 \Rightarrow 796 \rightarrow 800; 314 \rightarrow 300$
 (Rounding to hundreds)
 \therefore Estimated difference = $800 - 300 = 500$
 (c) $12,904 + 2,888 \Rightarrow 12,904 \rightarrow 13,000;$
 $2,888 \rightarrow 3000$
 (Rounding to thousands)
 \therefore Estimated sum = $13,000 + 3,000 = 16,000$

$$(d) 28,292 - 21,496 \Rightarrow 28,292 \rightarrow 28,000;$$

$$21,496 \rightarrow 21,000$$

(Rounding to thousands)

$$\therefore \text{Estimated difference}$$

$$= 28,000 - 21,000 = 7,000$$

5. (a) $439 + 334 + 4,317$

Rounding off to hundreds :

$$439 \rightarrow 400; \quad 334 \rightarrow 300; \quad 4,317 \rightarrow 4,300$$

$$\text{Rough estimate} = 400 + 300 + 4,300 = 5,000$$

Rounding off to tens :

$$439 \rightarrow 440; \quad 334 \rightarrow 330; \quad 4,317 \rightarrow 4,320$$

$$\text{Closer estimate} = 440 + 330 + 4,320 = 5,090$$

(b) $1,08,734 - 47,599$

Rounding off to hundreds :

$$1,08,734 \rightarrow 1,08,700 \quad 47,599 \rightarrow 47,600$$

$$\text{Rough estimate} = 1,08,700 - 47,600 = 61,100$$

Rounding off to tens :

$$1,08,734 \rightarrow 1,08,730 \quad 47,599 \rightarrow 47,600$$

$$\text{Closer estimate} = 1,08,730 - 47,600 = 61,130$$

(c) $8,325 - 491$

Rounding off to hundreds :

$$8,325 \rightarrow 8,300; \quad 491 \rightarrow 500$$

$$\text{Rough estimate} = 8,300 - 500 = 7,800$$

Rounding off to tens :

$$8,325 \rightarrow 8,330; \quad 491 \rightarrow 490$$

$$\text{Closer estimate} = 8,330 - 490 = 7,840$$

(d) $4,89,348 - 48,365$

Rounding off to hundreds :

$$4,89,348 \rightarrow 4,89,300 \quad 48,365 \rightarrow 48,400$$

$$\text{Rough estimate} = 4,89,300 - 48,400 = 4,40,900$$

Rounding off to tens :

$$4,89,348 \rightarrow 4,89,350 \quad 48,365 \rightarrow 48,370$$

$$\text{Closer estimate} = 4,89,350 - 48,370 = 4,40,980$$

6. (a) 578×161

Rounding off to hundreds :

$$578 \rightarrow 600; \quad 161 \rightarrow 200$$

$$\therefore \text{Estimated product} = 600 \times 200 = 1,20,000$$

(b) $5,281 \times 3,491$

Rounding off to thousands and hundreds :

$$5,281 \rightarrow 5,000; \quad 3,491 \rightarrow 3,500$$

$$\therefore \text{Estimated product} = 5,000 \times 3,500$$

$$= 1,75,00,000$$

(c) $1,291 \times 592$

Rounding off to hundreds :

$$1,291 \rightarrow 1,300; \quad 592 \rightarrow 600$$

$$\therefore \text{Estimated product} = 1,300 \times 600 = 7,80,000$$

(d) $9,250 \times 29$

Rounding off to hundreds and tens :

$$9,250 \rightarrow 9,300; \quad 29 \rightarrow 30$$

$$\therefore \text{Estimated product} = 9,300 \times 30 = 2,79,000$$

7. Number of radio sets to be purchased = 40

Cost of one radio set = ₹ 1200

Cost of 40 radio set = ₹ 1200 \times 40 = ₹ 48,000

Total money with the merchant = ₹ 78,592

$$\therefore \text{Money that will remain with the merchant after}$$

$$\text{purchasing 40 sets} = ₹ 78,592 - ₹ 48,000$$

$$= ₹ 30,592$$

8. Given digits are 6, 2, 7, 4 and 3

The greatest number using these digits = 76,432

The least number using these digits = 23,467

$$\therefore \text{Difference} = 76,432 - 23,467 = 52,965$$

2

Whole Numbers

EXERCISE 2.1

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.

EXERCISE 2.2

- Given in answersheet.

(a) 3, 8 and 19

Let $a = 3$, $b = 8$ and $c = 19$

$$a + (b + c) = (a + b) + c$$

$$3 + (8 + 19) = (3 + 8) + 19$$

$$3 + 27 = 11 + 19$$

$$30 = 30$$

$$\text{L.H.S.} = \text{R.H.S.}$$

(b) 13, 23 and 41

Let $a = 13$, $b = 23$ and $c = 41$

$$a + (b + c) = (a + b) + c$$

$$13 + (23 + 41) = (13 + 23) + 41$$

$$13 + 64 = 36 + 41$$

$$77 = 77$$

$$\text{L.H.S.} = \text{R.H.S.}$$

(c) 11, 17 and 26

Let $a = 11$, $b = 17$ and $c = 26$

$$a + (b + c) = (a + b) + c$$

$$11 + (17 + 26) = (11 + 17) + 26$$

$$11 + 43 = 28 + 26$$

$$54 = 54$$

$$\text{L.H.S.} = \text{R.H.S.}$$

(d) 15, 16 and 17

$$\text{Let } a = 15, b = 16 \text{ and } c = 17$$

$$a + (b + c) = (a + b) + c$$

$$15 + (16 + 17) = (15 + 16) + 17$$

$$15 + 33 = 31 + 17$$

$$48 = 48$$

$$\text{L.H.S.} = \text{R.H.S.}$$

3. (a) $16 + 28 + 84 = (16 + 84) + 28 = 100 + 28 = 128$

(b) $837 + 525 + 163 = (837 + 163) + 525$
 $= 1000 + 525 = 1525$

(c) $7048 + 313 + 2952 + 587$
 $= (7048 + 2952) + (313 + 587)$
 $= 10000 + 900 = 10900$

(d) $89 + 68 + 47 + 18 + 2 + 11 + 3 + 12$
 $= (89 + 11) + (68 + 12) + (47 + 3) + (18 + 2)$
 $= 100 + 80 + 50 + 20 = 250$

4. (a) $2096 + 9 = 2096 + (10 - 1)$
 $= 2096 + 10 - 1 = 2105$

(b) $4816 + 9 = 4816 + (10 - 1)$
 $= 4816 + 10 - 1 = 4825$

(c) $1964 + 99 = 1964 + (100 - 1)$
 $= 1964 + 100 - 1 = 2063$

(d) $3178 + 99 = 3178 + (100 - 1)$
 $= 3178 + 100 - 1 = 3277$

(e) $4196 + 995 = 4196 + (1000 - 5)$
 $= 4196 + 1000 - 5 = 5191$

(f) $30968 + 9999 = 30968 + (10000 - 1)$
 $= 40967$

5. (a)

15	8	13
10	12	14
11	16	9

2	7	6
9	5	1
4	3	8

(c)

1	14	15	4
8	11	10	5
12	7	6	9
13	2	3	16

(d)

2	15	16	5
9	12	11	6
13	8	7	10
14	3	4	17

⇒ EXERCISE 2.3

1. Do yourself.

2. Do yourself.

3. (a) $4532 - 1892 = 2640$
and $2640 + 1892 = 4532$ checked by addition

(b) $100000 - 45268 = 54732$
and $54732 + 45268 = 100000$
checked by addition

(c) $96345 - 7235 = 89110$
and $89110 + 7235 = 96345$
checked by addition

(d) $91237 - 90064 = 1173$
and $1173 + 90064 = 91237$
checked by addition

4. (a) $x + 7 = 10$
 $x + 7 + (-7) = 10 + (-7)$
 $x = 3$

(b) $x - 6 = 4$
 $x - 6 + 6 = 4 + 6$
 $x = 10$

(c) $x - 1 = 17$
 $x - 1 + 1 = 17 + 1$
 $x = 18$

(d) $x + 3 = 9$
 $x + 3 + (-3) = 9 - 3$
 $x = 6$

(e) $x + 18 = 29$
 $x + 18 - 18 = 29 - 18$
 $x = 11$

(f) $x - 4 = 13$
 $x - 4 + 4 = 13 + 4$
 $x = 17$

5. Saksham deposited money = ₹ 58500
He withdrew = ₹ 39400
So, ₹ 58,500 - ₹ 39,400 = ₹ 19,100
Left money = ₹ 19,100

6. Dinesh had money = ₹ 5,00,000
Cost of plot = ₹ 3,98,000
So, ₹ 5,00,000 - ₹ 3,98,000 = ₹ 1,02,000
Left money = ₹ 1,02,000

⇒ EXERCISE 2.4

1. (a) 542, commutative,
(b) 4196, multiplicative property of 1,
(c) multiplicative identity of 0,
(d) 57,96, associative,
(e) 5000, associative,
(f) 37, 42, 16 distributive;

2. (a) $125 \times 137 \times 8 = (125 \times 8) \times 137$
 $= 1000 \times 137$
 $= 137000$

(b) $625 \times 279 \times 16 = (625 \times 16) \times 279$
 $= 10000 \times 279 = 2790000$

(c) $285 \times 40 \times 5 = 285 \times 200$
 $= 57000$

(d) $125 \times 8 \times 45 \times 15 = (125 \times 8) \times (45 \times 15)$
 $= 1000 \times 675 = 675000$

(e) $225 \times 140 \times 4 \times 5 = (225 \times 4) (140 \times 5)$
 $= 900 \times 700 = 630000$

(f) $16 \times 1947 \times 25 = (16 \times 25) \times 1947$
 $= 400 \times 1947 = 778800$

3. (a) $487 \times 102 = 487 \times (100 + 2)$
 $= 48700 + 487 \times 2$
 $= 48700 + 974 = 49674$

(b) $796 \times 1006 = 796 \times (1000 + 6)$
 $= 796000 + 796 \times 6$
 $= 796000 + 4776 = 800776$

(c) $638 \times 78 = 638 \times (70 + 8)$
 $= 638 \times 70 + 638 \times 8$
 $= 44660 + 5104 = 49764$

(d) $376 \times 93 = 376 \times (90 + 3)$
 $= 376 \times 90 + 376 \times 3$
 $= 33840 + 1128 = 34968$

(e) $912 \times 806 = 912 \times (800 + 6)$
 $= 912 \times 800 + 912 \times 6$
 $= 729600 + 5472 = 735072$

(f) $549 \times 84 = 549 \times (80 + 4)$
 $= 549 \times 80 + 549 \times 4$
 $= 43920 + 2196 = 46116$

4. (a) $563 \times 98 = 563 \times (100 - 2)$
 $= 563 \times 100 - 563$
 $= 56300 - 563 = 55737$

(b) $414 \times 990 = 414 \times (1000 - 10)$
 $= 414000 - 4140 = 409860$

(c) $436 \times 96 = 436 \times (100 - 4)$
 $= 436 \times 100 - 436 \times 4$
 $= 43600 - 1744 = 41856$

(d) $897 \times 986 = 897 \times (1000 - 14)$
 $= 897000 - 897 \times 14$
 $= 897000 - 12558 = 884442$

(e) $2056 \times 97 = 2056 \times (100 - 3)$
 $= 205600 - 2056 \times 3$
 $= 205600 - 6168 = 199432$

(f) $678 \times 989 = 678 \times (1000 - 11)$
 $= 678000 - 678 \times 11$
 $= 678000 - 7458 = 670542$

5. (a) $625 \times 84 + 625 \times 9 + 625 \times 7$
 $= 625 \times (84 + 9 + 7)$
 $= 625 \times 100 = 62500$

(b) $568 \times 999 + 568 = 568 \times (999 + 1)$
 $= 568 \times 1000 = 568000$

(c) $493 \times 67 + 493 \times 18 + 493 \times 15$
 $= 493 \times (67 + 18 + 15)$
 $= 493 \times 100 = 49300$

(d) $918 \times 1006 - 918 \times 6 = 918 \times (1006 - 6)$
 $= 918 \times 1000 = 918000$

(e) $3845 \times 5 \times 782 + 769 \times 25 \times 218$
 $= (3845 \times 5) \times 782 + (769 \times 25) \times 218$
 $= 19225 \times 782 + 19225 \times 218$
 $= 19225 \times (782 + 218)$
 $= 19225 \times 1000 = 19225000$

(f) $518 \times 56 + 518 \times 43 + 518 \times 18 - 518 \times 17$
 $= 518 \times (56 + 43 + 18 - 17)$
 $= 518 \times 100 = 51800$

(g) $4125 \times 6 + 4125 \times 18 - 4125 \times 10 - 4125 \times 14$
 $= 4125 \times (6 + 18 - 10 - 14)$
 $= 4125 \times 0 = 0$

(h) $3186 \times 5 + 3186 \times 14 - 3186 \times 9$
 $= 3186 \times (5 + 14 - 9)$
 $= 3186 \times (5 + 14 - 9) = 3186 \times 10$
 $= 31860$

6. Yes

7. One number is zero.

8. $P = 0$

9. Cost of one LCD = ₹ 29980

Cost of 129 = ₹ (29980×129) = ₹ 3867420

10. Cost of one flat = ₹ 12,14,500

Cost of 132 flats = ₹ (1214500×132)
 $= ₹ 160314000$

EXERCISE 2.5

1. Given in answersheet.

2. (a) $472 - (472 \div 1)$

$$= 472 - 472 = 0$$

(b) $746 + (0 \div 10)$

$$= 746 + 0 = 746$$

(c) $638 - (683 \div 683)$

$$= 638 - 1 = 637$$

(d) $94464 \div (288 - 32)$

$$= 94464 \div 256 = 369$$

(e) $(15625 \div 125) \div 25$

$$= 125 \div 25 = 5$$

$$(f) 478 + (580 \div 58)$$

$$= 478 + 10 = 488$$

3. (a) $45683 \div 49$

$$\begin{array}{r} 49 \overline{) 45683} \quad (932 \\ \underline{-441} \\ 158 \\ \underline{-147} \\ 113 \\ \underline{-98} \\ 15 \end{array}$$

So, quotient = 932
remainder = 15
by division algorithm
 $45683 = 932 \times 49 + 15$
 $= 45668 + 15$
 $= 45683$

(b) $56812 \div 237$

$$\begin{array}{r} 237 \overline{) 56812} \quad (239 \\ \underline{-474} \\ 941 \\ \underline{-711} \\ 2302 \\ \underline{-2133} \\ 169 \end{array}$$

So, quotient = 239
remainder = 169
by division algorithm
 $56812 = 239 \times 237 + 169$
 $= 56643 + 169$
 $= 56812$

(c) $91864 \div 53$

$$\begin{array}{r} 53 \overline{) 91864} \quad (1733 \\ \underline{-53} \\ 388 \\ \underline{-371} \\ 176 \\ \underline{-159} \\ 174 \\ \underline{-159} \\ 15 \end{array}$$

So, quotient = 1733
remainder = 15
by division algorithm
 $91864 = 1733 \times 53 + 15$
 $= 91849 + 15$
 $= 91864$

(d) $91261 \div 450$

$$\begin{array}{r} 450 \overline{) 91261} \quad (202 \\ \underline{-900} \\ 1261 \\ \underline{-900} \\ 361 \end{array}$$

So, quotient = 202
remainder = 361
by division algorithm
 $91261 = 202 \times 450 + 361$
 $= 90900 + 361 = 91261$

(e) $31784 \div 1000$

$$\begin{array}{r} 1000 \overline{) 31784} \quad (31 \\ \underline{-3000} \\ 1784 \\ \underline{-1000} \\ 784 \end{array}$$

So, quotient = 31
remainder = 784
by division algorithm
 $31784 = 31 \times 1000 + 784$
 $= 31000 + 784 = 31784$

(f) $768123 \div 506$

$$\begin{array}{r} 506 \overline{) 768123} \quad (1518 \\ \underline{-506} \\ 2621 \\ \underline{-2530} \\ 912 \\ \underline{-506} \\ 4063 \\ \underline{-4048} \\ 15 \end{array}$$

So, quotient = 1518
remainder = 15
by division algorithm
 $768123 = 1518 \times 506 + 15$
 $= 768108 + 15 = 768123$

4. Largest 4-digit number = 9999

$$\begin{array}{r} 32 \overline{) 9999} \quad (312 \\ \underline{-96} \\ 39 \\ \underline{-32} \\ 79 \\ \underline{-64} \\ 15 \end{array}$$

So, required number = $9999 - 15 = 9984$

5. Smallest 6-digit number = 100000

$$\begin{array}{r} 43 \overline{)100000} \text{ (2325)} \\ \underline{-86} \\ 140 \\ \underline{-129} \\ 110 \\ \underline{-86} \\ 240 \\ \underline{-215} \\ 25 \end{array}$$

$$2325 \times 43 = 99975$$

$$99975 + 43 = 100018$$

So, required number = 100018.

6. $2562 \div 41$

$$\begin{array}{r} 41 \overline{)2562} \text{ (62)} \\ \underline{-246} \\ 102 \\ \underline{-82} \\ 20 \end{array}$$

So, required number is 20.

7.

$$\begin{array}{r} 28 \overline{)10000} \text{ (357)} \\ \underline{-84} \\ 160 \\ \underline{-140} \\ 200 \\ \underline{-196} \\ 4 \end{array}$$

$$357 \times 28 = 9996 \Rightarrow 9996 + 27 = 10024$$

$$10024 - 10000 = 24$$

So, required number = 24.

8. (a) $12345 \times 9 + 6 = 111111$
 $123456 \times 9 + 7 = 1111111$
 $1234567 \times 9 + 8 = 11111111$
 $12345678 \times 9 + 9 = 111111111$
- (b) $98765 \times 9 + 3 = 888888$
 $987654 \times 9 + 2 = 8888888$
 $9876543 \times 9 + 1 = 88888888$
 $98765432 \times 9 + 0 = 888888888$

➤ HOTS.....

- Given in answersheet.
- Least 5-digit number = 10000

$$\begin{array}{r} 43 \overline{)10000} \text{ (232)} \\ \underline{-86} \\ 140 \\ \underline{-129} \\ 110 \\ \underline{-86} \\ 24 \end{array}$$

$$232 \times 43 = 9976$$

$$9976 + 43 = 10019$$

3. Smallest 5-digit number = 10000
 Smallest 5-digit number with three different digits = 10002

$$\text{Largest 4-digit number} = 9999$$

$$\text{Largest 4-digit number with all different digits} = 9876$$

Difference between the smallest 5-digit number with three different digits and the largest 4-digit number with all different digits = $10002 - 9876 = 126$

So, the smallest 5-digit number with three different digits is greater than the largest 4-digit number with all different digits by 126.

4. Number of small buildings = 14

$$\text{Number of floors in each building} = 14$$

$$\therefore \text{Number of floors in 14 buildings} = 14 \times 14 = 196$$

Number of apartments on each floor in a small building = 3

$$\begin{aligned} \text{Total number of apartments in small buildings} \\ = 196 \times 3 = 588 \end{aligned}$$

$$\text{Number of large buildings} = 28$$

$$\text{Number of floors in each building} = 12$$

$$\therefore \text{Number of floors in 28 buildings} = 12 \times 28 = 336$$

Number of apartments on each floor in large building = 2

$$\begin{aligned} \text{Total number of apartments in large building} \\ = 336 \times 2 = 672 \end{aligned}$$

$$\begin{aligned} \text{Total number of apartments} &= \text{Total number of} \\ &\text{apartments in small building} + \text{Total number of} \\ &\text{apartments in large building} \\ &= 588 + 672 = 1260 \end{aligned}$$

5. We have,

$$\text{Product of unit's digits} = 15$$

$$\text{Product of units digits} = 3 \times 5$$

[\because Unit's digits are one digit numbers]

So, units digits are 3 and 5.

$$\text{Product of ten's digits} = 28$$

$$\text{Product of tens digits} = 4 \times 7$$

[Ten's digits are one digit numbers]

Thus, the two numbers are either 43 and 75 or 45 and 73.

$$\begin{aligned} \text{Now, } 43 \times 75 &= 43 \times (70 + 5) \\ &= 43 \times 70 + 43 \times 5 \\ &= 3010 + 215 = 3225 \\ 43 \times 73 &= 73 \times (40 + 5) \\ &= 73 \times 40 + 73 \times 5 \\ &= 2920 + 365 = 3285 \end{aligned}$$

It is given that the product of the numbers is 3285.
Hence, the numbers are 45 and 73.

⇒ NCERT CORNER

- 0 is the smallest whole number.
- (a) The whole number 503 is on the left of the whole number 530 on the number line.
∴ $530 > 503$
(b) The whole number 307 is on the left of the whole number 370 on the number line.
∴ $370 > 307$
(c) The whole number 56789 is on the left of the whole number 98765 on the number line.
∴ $98765 > 56789$
(d) The whole number 9830415 is on the left of the whole number 10023001 on the number line.
∴ $9830415 < 10023001$
- (a) $837 + 208 + 363 = 208 + (837 + 363)$
 $= 208 + 1200 = 1408$
(b) $1962 + 453 + 1538 + 647$
 $= (1962 + 1538) + (453 + 647)$
 $= 3500 + 1100 = 4600$
- (a) $738 \times 103 = 738 \times (100 + 3)$
 $= (738 \times 100) + (738 \times 3)$
 $= 73800 + 2214 = 76014$
(b) $854 \times 102 = 854 \times (100 + 2)$
 $= (854 \times 100) + (854 \times 2)$
 $= 85400 + 1708 = 87108$
(c) $258 \times 1008 = 258 \times (1000 + 8)$
 $= (258 \times 1000) + (258 \times 8)$
 $= 258000 + 2064 = 260064$
(d) $1005 \times 168 = 168 \times 1005$
 $= 168 \times (1000 + 5)$
 $= (168 \times 1000) + (168 \times 5)$
 $= 168000 + 840 = 168840$
- Milk supplied in the morning = 32 litres
Milk supplied in the evening = 68 litres
Milk supplied per day = (32 + 68) litres
Cost of milk per litre = ₹ 15
Total cost of milk = ₹ $15 \times (32 + 68)$
 $= ₹ 15 \times 100 = ₹ 1500$
- (a) $728 \times 101 = 728 \times (100 + 1)$
 $= (728 \times 100) + (728 \times 1)$
 $= 72800 + 728 = 73528$
(b) $5437 \times 1001 = 5437 \times (1000 + 1)$
 $= (5437 \times 1000) + (5437 \times 1)$
 $= 5437000 + 5437 = 5442437$

$$\begin{aligned} \text{(c) } 824 \times 25 &= 824 \times (20 + 5) \\ &= (824 \times 20) + (824 \times 5) \\ &= 16480 + 4120 = 20600 \end{aligned}$$

$$\begin{aligned} \text{(d) } 4275 \times 125 &= 4275 \times (100 + 20 + 5) \\ &= (4275 \times 100) + (4275 \times 20) + (4275 \times 5) \\ &= 427500 + 85500 + 21375 = 534375 \end{aligned}$$

7. The next two steps will be :

$$\begin{aligned} 123456 \times 8 + 6 &= 987654 \\ 1234567 \times 8 + 7 &= 9876543 \end{aligned}$$

The working of the pattern :

$$\begin{aligned} 1 \times 8 + 1 &= 9 \\ (11 + 1) \times 8 + 2 &= 12 \times 8 + 2 = 98 \\ (111 + 11 + 1) \times 8 + 3 &= 123 \times 8 + 3 = 987 \\ (1111 + 111 + 11 + 1) \times 8 + 4 &= 1234 \times 8 + 4 = 9876 \\ (11111 + 1111 + 111 + 11 + 1) \times 8 + 5 &= 12345 \times 8 + 5 = 98765 \\ (111111 + 11111 + 1111 + 111 + 11 + 1) \times 8 + 6 &= 123456 \times 8 + 6 = 987654 \\ (1111111 + 111111 + 11111 + 1111 + 111 + 11 + 1) \times 8 + 7 &= 1234567 \times 8 + 7 = 9876543 \end{aligned}$$

3 Playing with Numbers

⇒ EXERCISE 3.1

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.

⇒ EXERCISE 3.2

- Given in answersheet.
- Given in answersheet.
- Do yourself.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Do yourself.
- Yes, 9
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- (a) Factors of 23 = 1, 23
Factors of 79 = 1, 79
There is no common factor between 23 and 79 except 1. So, the pair of 23 and 79 are co-prime numbers.

- (b) Factors of 39 = 1, 3, 13, 39
 Factors of 68 = 1, 2, 4, 17, 34, 68
 There is no common factor between 39 and 69 except 1. So, the pair of 39 and 68 are co-prime numbers.
- (c) Factors of 47 = 1, 47
 Factors of 61 = 1, 61
 There is no common factor between 47 and 61 except 1. So, the pair of 47 and 61 are co-prime numbers.
- (d) Factors of 315 = 1, 3, 5, 7, 9,
 Factors of 475 = 1, 5, 19,
 Here 5 and 1 are the common factors between 315 and 475. So, the pair of 315 and 475 are not co-prime numbers.
- (e) Factors of 81 = 1, 3, 9, 27, 81
 Factors of 118 = 1, 2, 59, 118
 There is no common factor between 81 and 118 except 1. So, the pair of 81 and 118 are co-prime numbers.
- (f) Factors of 512 = 1, 2, 4, 8, 16, 32, 64, 128, 256
 Factors of 945 = 1, 3, 5, 7, 9, 15, 63, 105, 135, 189, 315, 945
 There is no common factor between 512 and 945 except 1. So, the pair of 512 and 945 are co-prime numbers.

⇒ **EXERCISE 3.3**

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- (a) 402479
 Sum of digit at odd places = $9 + 4 + 0 = 13$
 Sum of digit at even places = $7 + 2 + 4 = 13$
 So, difference = $13 - 13 = 0$
 So, 402479 is divisible by 11.
- (b) 724823
 Sum of digit at odd places = $3 + 8 + 2 = 13$
 Sum of digit at even places = $2 + 4 + 7 = 13$
 So, difference = $13 - 13 = 0$
 So, 724823 is divisible by 11.
- (c) 901153
 Sum of digit at odd places = $3 + 1 = 4$
 Sum of digit at even places = $5 + 1 + 9 = 15$
 So, difference = $15 - 4 = 11$
 So, 901153 is divisible by 11.
- (d) 1569543
 Sum of digit at odd places = $3 + 5 + 6 + 1 = 15$

- Sum of digit at even places = $4 + 9 + 5 = 18$
 So, difference = $18 - 15 = 3$
 So, 1569543 is not divisible, by 11
- (e) 106859
 Sum of digit at even places = $9 + 8 + 0 = 17$
 Sum of digit at odd places = $5 + 6 + 1 = 12$
 So, difference = $17 - 12 = 5$
 So, 106859 is not divisible by 11.
- (f) 6538164
 Sum of digit at even places = $4 + 1 + 3 + 6 = 14$
 Sum of digit at odd places = $6 + 8 + 5 = 19$
 So, difference = $19 - 14 = 5$
 So, 6538164 is not divisible by 11.
- (g) 5717232
 Sum of digit at odd places = $2 + 2 + 1 + 5 = 10$
 Sum of digit at even places = $3 + 7 + 7 = 17$
 So, difference = $17 - 10 = 7$
 So, 5717232 is not divisible by 11.
- (h) 7138965
 Sum of digit at odd places = $5 + 9 + 3 + 7 = 24$
 Sum of digit at even places = $6 + 8 + 1 = 15$
 So, difference = $24 - 15 = 9$
 So, 7138965 is not divisible by 11.
- (i) 786594
 Sum of digit at odd places = $4 + 5 + 8 = 17$
 Sum of digit at even places = $9 + 6 + 7 = 22$
 So, difference = $22 - 17 = 5$
 So, 786594 is not divisible by 11.
- (j) 413867
 Sum of digit at odd places = $7 + 8 + 1 = 16$
 Sum of digit at even places = $6 + 3 + 4 = 13$
 So, difference = $16 - 13 = 3$
 So, 413867 is not divisible by 11.
5. (a) Let smallest digit be x

$$768x4 = 7 + 6 + 8 + x + 4$$

$$= 25 + x$$

$$25 + x = 27$$

$$x = 2$$
- (b) $912x65$

$$9 + 1 + 2 + x + 6 + 5 = 23 + x$$

$$23 + x = 27$$

$$\therefore x = 4$$
- (c) $178x06$

$$1 + 7 + 8 + x + 0 + 6 = 22 + x$$

$$22 + x = 27$$

$$x = 27 - 22 = 5$$

(d) $514x21$

$$\begin{aligned}5 + 1 + 4 + x + 2 + 1 &= 13 + x \\13 + x &= 18 \\x &= 18 - 13 = 5\end{aligned}$$

6. (a) $92x389$

$$\begin{aligned}(9 + 3 + 2) - (8 + x + 9) &= 14 - 17 - x \\&= -3 - x \\-3 - x &\text{ should be equal to 0 or 11} \\-3 - x &= 0 \\-x &= 3 \\x &= -3 \text{ (not possible)} \\-3 - x &= 11 \\-x &= +3 \\(8 + x +) - (9 + 3 + 2) &= 17 + x - 14 = 3 + x \\3 + x &= 0 \text{ or } 11 \\3 + x &= 0 \\x &= -3 \text{ (not possible)} \\x + 3 &= 11 \\x &= 8\end{aligned}$$

So, 8 will be required smallest digit.

(b) $4168x32$

$$\begin{aligned}(2 + x + 6 + 4) - (3 + 8 + 1) &= 12 + x - 12 = x \\x &= 0\end{aligned}$$

So, 0 will be required smallest digit.

(c) $8x9483$

$$\begin{aligned}(8 + 9 + 8) - (3 + 4 + x) &= 25 - 7 - x \\&= 18 - x \\18 - x &= 11 \\x &= 18 - 11 = 7\end{aligned}$$

(d) $71x865$

$$\begin{aligned}(5 + 8 + 1) - (6 + x + 7) &= 14 - 13 - x \\x &= 1\end{aligned}$$

So, 1 will be required smallest digit.

EXERCISE 3.4

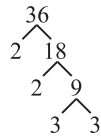
1. (a) Factors of 35 are 1, 5, 7, 35
Factors of 50 are 1, 2, 5, 10, 25, 50
So, common factors are 1 and 5.
- (b) Factors of 56 are 1, 2, 4, 7, 8, 14, 28, 56
Factors of 120 are 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60, 120
Common factors are 1, 2, 4, 8
- (c) Factors of 8 are 1, 2, 4, 8
Factors of 12 are 1, 2, 3, 4, 6, 12
Factors of 18 are 1, 2, 3, 6, 9, 18
Common factors are 1, 2

- (d) Factors of 5 are 1, 5
Factors of 15 are 1, 3, 5, 15
Factors of 25 are 1, 5, 25
Common factors are 1, 5

- (e) Factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
Factors of 75 are 1, 3, 5, 15, 25, 75
Factors of 210 are 1, 2, 3, 5, 6, 7, 10, 15, 21, 30, 35, 42, 70, 105, 210
Common factors are 1, 3, 5, 15

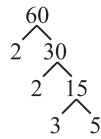
2. (a) Multiples of 6 are 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72
Multiples of 8 are 8, 16, 24, 32, 40, 48, 56, 64, 72
So, first three common multiples are 24, 48, 72.
- (b) Multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64
Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70
So, first three common multiples are 20, 40 and 60.
- (c) Multiples of 12 are 12, 24, 36, 48, 60, 72, 84, 96, 108, 120.
Multiples of 18 are 18, 36, 54, 72, 90, 108, 126
So, first three common multiples are 36, 72, 108
- (d) Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, ...
Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, ...
Multiples of 6 are 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, ...
So, first three common multiples are 30, 60, 90
- (e) Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99, 102, 105, 108, 111...
Multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100, 104, 108
Multiples of 9 are 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108...
So, first three common multiples are 36, 72, 108
3. Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99
Multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96.
Common multiples are 12, 24, 36, 48, 60, 72, 84, 96

4. (a)



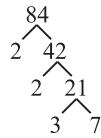
$\therefore 36 = 2 \times 2 \times 3 \times 3$

(b)



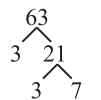
$\therefore 60 = 2 \times 2 \times 3 \times 5$

(c)



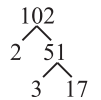
$\therefore 84 = 2 \times 2 \times 3 \times 7$

(d)



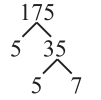
$\therefore 63 = 3 \times 3 \times 7$

(e)



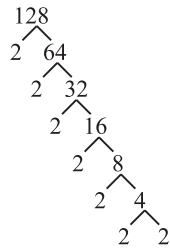
$\therefore 102 = 2 \times 3 \times 17$

(f)



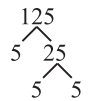
$\therefore 175 = 5 \times 5 \times 7$

(g)



$\therefore 128 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

(h)



$\therefore 125 = 5 \times 5 \times 5$

5. (a)

7	637
7	91
13	31
	1

$637 = 7 \times 7 \times 13$
 $= 7^2 \times 13$

(b)

2	540
2	270
3	135
3	45
3	15
5	5
	1

$540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5 = 2^2 \times 3^3 \times 5$

(c)

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^8$

(d)

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^6 \times 3^3$

(e)

2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$1024 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^{10}$

6. (a)

5	175175
5	35035
7	7007
7	1001
11	143
13	13
	1

$$175175 = 5 \times 5 \times 7 \times 7 \times 11 \times 13$$

$$= 5^2 \times 7^2 \times 11 \times 13$$

(b)

2	145530
3	72765
3	24255
3	8085
5	2695
7	539
7	77
11	11
	1

$$145530 = 2 \times 3 \times 3 \times 3 \times 5 \times 7 \times 7 \times 11$$

$$= 2 \times 3^3 \times 5 \times 7^2 \times 11$$

(c)

2	194480
2	97240
2	48620
2	24310
5	12155
11	2431
13	221
17	17
	1

$$194480 = 2 \times 2 \times 2 \times 2 \times 5 \times 11 \times 13 \times 17$$

$$= 2^4 \times 5 \times 11 \times 13 \times 17$$

EXERCISE 3.5

1. (a) Factors of 18 are 1, 2, 3, 6, 9, 18
 Factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
 Common factors are 1, 2, 3, 6
 So, HCF is 6
- (b) Factors of 18 are 1, 2, 3, 6, 9, 18,
 Factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
 Common factors are 1, 2, 3, 6
 So, HCF is 6
- (c) Factors of 27 are 1, 3, 9, 27
 Factors of 63 are 1, 3, 7, 9, 21, 63
 Common factors are 1, 3, 9
 So, HCF is 9
- (d) Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, 36
 Factors of 84 are 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
 Common factors are 1, 2, 3, 4, 6, 12
 So, HCF is 12
- (e) Factors of 70 are 1, 2, 5, 7, 10, 14, 35, 70
 Factors of 105 are 1, 3, 5, 7, 15, 21, 35, 105
 Factors of 175 are 1, 5, 7, 25, 35, 175

Common factors are 1, 5, 7, 35
 So, HCF is 35

- (f) Factors of 35 are 1, 5, 7, 35
 Factors of 63 are 1, 3, 7, 9, 21, 63
 Factors of 77 are 1, 7, 11, 77
 Common factors are 1, 7
 So, HCF is 7

2. (a) 47 and 61 have no common factors so HCF of 47 and 61 is 1.

(b)

2	84
2	42
3	21
7	7
	1

2	96
2	48
2	24
2	12
2	6
3	3
	1

$$84 = 2 \times 2 \times 3 \times 7$$

$$= 2^2 \times 3 \times 7$$

$$96 = 2 \times 2 \times 2 \times 2 \times 3$$

$$= 2^5 \times 3$$

So, HCF = $2^2 \times 3 = 12$

(c)

2	34
17	17
	1

2	102
3	51
17	17
	1

$$34 = 2 \times 17$$

$$102 = 2 \times 3 \times 17$$

So, HCF = $2 \times 17 = 34$

(d)

3	225
3	75
5	25
5	5
	1

5	475
5	95
19	19
	1

$$225 = 3 \times 3 \times 5 \times 5 = 3^2 \times 5^2$$

$$475 = 5 \times 5 \times 19$$

$$= 5^2 \times 19$$

So, HCF = $5^2 = 25$

(e)

2	170
5	85
17	17
	1

2	238
7	119
17	17
	1

$$170 = 2 \times 5 \times 17$$

$$238 = 2 \times 7 \times 17$$

So, HCF = $2 \times 17 = 34$

(f)

2	144
2	72
2	36
2	18
3	9
3	3
	1

2	198
3	99
3	33
11	11
	1

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$$

$$198 = 2 \times 3 \times 3 \times 11 = 2 \times 3^2 \times 11$$

$$\text{So, HCF} = 2 \times 3^2 = 18$$

(g)

2	18
3	9
3	3
	1

2	54
3	27
3	9
3	3
	1

3	81
3	27
3	9
3	3
	1

$$18 = 2 \times 3 \times 3 = 2 \times 3^2$$

$$54 = 2 \times 3 \times 3 \times 3 = 2 \times 3^3$$

$$81 = 3 \times 3 \times 3 \times 3 = 3^4$$

$$\text{So, HCF} = 3^2 = 9$$

(h)

2	72
2	36
2	18
3	9
3	3
	1

2	120
2	60
2	30
3	15
5	5
	1

5	145
29	29
	1

$$72 = 2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2$$

$$120 = 2 \times 2 \times 2 \times 3 \times 5 = 2^3 \times 3 \times 5$$

$$145 = 5 \times 29$$

$$\text{So, HCF} = 1$$

(i)

2	84
2	42
3	21
7	7
	1

2	120
2	60
2	30
3	15
5	5
	1

2	138
3	69
23	23
	1

$$84 = 2 \times 2 \times 3 \times 7 = 2^2 \times 3 \times 7$$

$$120 = 2 \times 2 \times 2 \times 3 \times 5 = 2^3 \times 3 \times 5$$

$$138 = 2 \times 3 \times 23$$

$$\text{So, HCF} = 2 \times 3 = 6$$

(j)

2	106
53	53
	1

3	159
53	53
	1

5	265
53	53
	1

$$106 = 2 \times 53$$

$$159 = 3 \times 53$$

$$265 = 5 \times 53$$

$$\text{So, HCF} = 53$$

(k)

2	144
2	72
2	36
2	18
3	9
3	3
	1

2	252
2	126
3	63
3	21
7	7
	1

2	630
3	315
3	105
5	35
7	7
	1

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$= 2^4 \times 3^2$$

$$252 = 2 \times 2 \times 3 \times 3 \times 7$$

$$= 2^2 \times 3^2 \times 7$$

$$630 = 2 \times 3 \times 3 \times 5 \times 7$$

$$= 2 \times 3^2 \times 5 \times 7$$

$$\text{So, HCF} = 2 \times 3^2 = 18$$

(l)

2	522
3	261
3	87
29	29
	1

2	1276
2	638
11	319
29	29
	1

2	1624
2	812
2	406
7	203
29	29
	1

$$522 = 2 \times 3 \times 3 \times 29$$

$$= 2 \times 3^2 \times 29$$

$$1276 = 2 \times 2 \times 11 \times 29$$

$$= 2^2 \times 11 \times 29$$

$$1624 = 2 \times 2 \times 2 \times 7 \times 29 = 2^3 \times 7 \times 29$$

$$\text{So, HCF} = 2 \times 29 = 58$$

3. (a)

$$\begin{array}{r} 225 \overline{)425} (1 \\ -225 \\ \hline 200 \overline{)225} (1 \\ -200 \\ \hline 25 \overline{)200} (8 \\ -200 \\ \hline 0 \end{array}$$

$$\text{So, HCF is 25.}$$

(b)

$$\begin{array}{r} 95 \overline{)171} (1 \\ -95 \\ \hline 76 \overline{)95} (1 \\ -76 \\ \hline 19 \overline{)76} (4 \\ -76 \\ \hline 0 \end{array}$$

$$\text{So, HCF is 19.}$$

$$\begin{array}{r}
 (c) \quad 2241 \overline{)8217} (3 \\
 \underline{-6723} \\
 1494 \overline{)2241} (1 \\
 \underline{-1494} \\
 747 \overline{)1494} (2 \\
 \underline{-1494} \\
 0
 \end{array}$$

So, HCF is 747.

$$\begin{array}{r}
 (d) \quad 1045 \overline{)1520} (1 \\
 \underline{-1045} \\
 475 \overline{)1045} (1 \\
 \underline{-475} \\
 95 \overline{)475} (2 \\
 \underline{-95} \\
 475 \overline{)475} (2 \\
 \underline{-475} \\
 0
 \end{array}$$

So, HCF is 95.

$$\begin{array}{r}
 (e) \quad 49 \overline{)91} (1 \\
 \underline{-49} \\
 42 \overline{)49} (1 \\
 \underline{-42} \\
 7 \overline{)42} (6 \\
 \underline{-42} \\
 0
 \end{array}$$

$$\boxed{
 \begin{array}{r}
 7 \overline{)112} (16 \\
 \underline{-7} \\
 42 \\
 \underline{-42} \\
 0
 \end{array}
 }$$

So, HCF is 7.

$$\begin{array}{r}
 (f) \quad 4875 \overline{)7845} (1 \\
 \underline{-4875} \\
 2970 \overline{)4875} (1 \\
 \underline{-2970} \\
 1905 \overline{)2970} (1 \\
 \underline{-1905} \\
 1065 \overline{)1905} (1 \\
 \underline{-1065} \\
 840 \overline{)1065} (1 \\
 \underline{-840} \\
 225 \overline{)840} (3 \\
 \underline{-225} \\
 165 \overline{)225} (1 \\
 \underline{-165} \\
 60 \overline{)165} (2 \\
 \underline{-120} \\
 45 \overline{)60} (1 \\
 \underline{-45} \\
 15 \overline{)45} (3 \\
 \underline{-15} \\
 0
 \end{array}$$

So, HCF is 15.

$$\begin{array}{r}
 (g) \quad 475 \overline{)650} (1 \\
 \underline{-475} \\
 175 \overline{)475} (2 \\
 \underline{-350} \\
 125 \overline{)175} (1 \\
 \underline{-125} \\
 50 \overline{)125} (2 \\
 \underline{-100} \\
 25 \overline{)50} (2 \\
 \underline{-50} \\
 0
 \end{array}$$

$$\boxed{
 \begin{array}{r}
 25 \overline{)825} (33 \\
 \underline{-75} \\
 75 \\
 \underline{-75} \\
 0
 \end{array}
 }$$

So, HCF is 25.

$$\begin{array}{r}
 (h) \quad 106 \overline{)159} (1 \\
 \underline{-106} \\
 53 \overline{)106} (2 \\
 \underline{-106} \\
 0
 \end{array}$$

$$\boxed{
 \begin{array}{r}
 53 \overline{)265} (5 \\
 \underline{-265} \\
 0
 \end{array}
 }$$

So, HCF is 53.

$$\begin{array}{r}
 (i) \quad 658 \overline{)940} (1 \\
 \underline{-658} \\
 282 \overline{)658} (2 \\
 \underline{-564} \\
 94 \overline{)282} (3 \\
 \underline{-94} \\
 188 \\
 \underline{-188} \\
 0
 \end{array}$$

$$\begin{array}{r}
 94 \overline{)1128} (12 \\
 \underline{-94} \\
 188 \\
 \underline{-188} \\
 0
 \end{array}$$

So, HCF is 94.

$$\begin{array}{r}
 (j) \quad 101 \overline{)573} (5 \\
 \underline{-505} \\
 68 \overline{)101} (1 \\
 \underline{-68} \\
 33 \overline{)68} (2 \\
 \underline{-66} \\
 2 \overline{)33} (16 \\
 \underline{-2} \\
 13 \\
 \underline{-12} \\
 1 \overline{)1079} (1079 \\
 \underline{-1079} \\
 0
 \end{array}$$

$$\begin{array}{r}
 1 \overline{)2} (1 \\
 \underline{-2} \\
 0
 \end{array}$$

So, HCF is 1.

$$\begin{array}{r}
 (k) \quad 1560 \overline{)5136} \quad (3 \\
 \underline{-4680} \\
 456 \overline{)1560} \quad (3 \\
 \underline{-1368} \\
 192 \overline{)456} \quad (2 \\
 \underline{-384} \\
 72 \overline{)192} \quad (2 \\
 \underline{-144} \\
 48 \overline{)72} \quad (1 \\
 \underline{-48} \\
 24 \overline{)48} \quad (2 \\
 \underline{-24} \\
 0
 \end{array}$$

So HCF is 24.

$$\begin{array}{r}
 (l) \quad 1824 \overline{)2176} \quad (1 \\
 \underline{-1824} \\
 352 \overline{)1824} \quad (5 \\
 \underline{-1760} \\
 64 \overline{)352} \quad (5 \\
 \underline{-320} \\
 32 \overline{)64} \quad (2 \\
 \underline{-64} \\
 0
 \end{array}$$

So HCF is 32.

4. Given in answersheet.

5. Required greatest number is HCF of $(245 - 5)$ and $(1030 - 6)$, i.e., of 240 and 1024.

$$\begin{array}{r}
 240 \overline{)1024} \quad (4 \\
 \underline{-960} \\
 64 \overline{)240} \quad (3 \\
 \underline{-192} \\
 48 \overline{)64} \quad (1 \\
 \underline{-48} \\
 16 \overline{)48} \quad (3 \\
 \underline{-48} \\
 0
 \end{array}$$

So, required number is 16.

6. Required largest number is HCF of $(245 - 5)$ and $(1029 - 5)$, i.e., of 240 and 1024

$$\begin{array}{r}
 240 \overline{)1024} \quad (4 \\
 \underline{-960} \\
 64 \overline{)240} \quad (3 \\
 \underline{-192} \\
 48 \overline{)64} \quad (1 \\
 \underline{-48} \\
 16 \overline{)48} \quad (3 \\
 \underline{-48} \\
 0
 \end{array}$$

So, required number is 16.

7. Required greatest number is HCF of $(530 - 8)$, $(1279 - 3)$ and $(1629 - 5)$, i.e., of 522, 1276 and 1624

$$\begin{array}{r}
 522 \overline{)1276} \quad (2 \\
 \underline{-1044} \\
 232 \overline{)522} \quad (2 \\
 \underline{-464} \\
 58 \overline{)232} \quad (4 \\
 \underline{-232} \\
 0
 \end{array}$$

$$\begin{array}{r}
 58 \overline{)1624} \quad (28 \\
 \underline{-116} \\
 464 \\
 \underline{-464} \\
 0
 \end{array}$$

So, required number is 58.

➔ **EXERCISE 3.6**

1. (a) Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, **(60)**,
 Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, **(60)**,
 Multiples of 12 are 12, 24, 36, 48, **(60)**,
 So, LCM is 60.
- (b) Multiples of 4 are 4, 8, 12, 16, 20, **(24)**, 28
 Multiples of 6 are 6, 12, 18, **(24)**, 30...
 Multiples of 8 are 8, 16, **(24)**, 32, ...
 So, LCM is 24.
- (c) Multiples of 6 are 6, 12, 18, **(24)**, 30
 Multiples of 8 are 8, 16, **(24)**, 32...
 Multiples of 12 are 12, **(24)**, 36.
 So, LCM is 24.
- (d) Multiples of 5 are 5, 10, 15, 20, 25, **(30)**, 35
 Multiples of 10 are 10, 20, **(30)**, 40..
 Multiple of 15 are 15, **(30)**, 45...
 So, LCM is 30.
- (e) Multiples of 8 are 8, 16, **(24)**, 32...
 Multiples of 12 are 12, **(24)**, 36..
 Multiples of 24 are **(24)**, 48,
 So, LCM is 24.
- (f) Multiples of 3 are 3, 6, 9, 12, 15, **(18)**, 21, 24, 27, 30, 33, 36, 39...
 Multiples of 6 are 6, 12, **(18)**, 24, 30, 36, 42...
 Multiples of 9 are 9, **(18)**, 27, 36, 45..
 Multiples of 18 are **(18)**, 36, 54.
 So, LCM is 18.

2. (a)

2	80
2	40
2	20
2	10
5	5
	1

2	108
2	54
3	27
3	9
3	3
	1

$$80 = 2 \times 2 \times 2 \times 2 \times 5 = 2^4 \times 5$$

$$108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$$

$$\text{So, LCM} = 2^4 \times 3^3 \times 5 = 2160$$

(b)

5	85
17	17
	1

7	119
17	17
	1

$$85 = 5 \times 17$$

$$119 = 7 \times 17$$

$$\text{So, LCM} = 5 \times 7 \times 17 = 595$$

(c)

2	144
2	72
2	36
2	18
3	9
3	3
	1

2	180
2	90
3	45
3	15
5	5
	1

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$$

$$180 = 2 \times 2 \times 3 \times 3 \times 5 = 2^2 \times 3^2 \times 5$$

$$\text{So, LCM} = 2^4 \times 3^2 \times 5 = 720$$

(d)

3	45
3	15
5	5
	1

3	105
5	35
7	7
	1

3	165
5	55
11	11
	1

$$45 = 3 \times 3 \times 5 = 3^2 \times 5$$

$$105 = 3 \times 5 \times 7$$

$$165 = 3 \times 5 \times 11$$

$$\text{So, LCM} = 3^2 \times 5 \times 7 \times 11 = 3465$$

(e)

2	180
2	90
3	45
3	15
5	5
	1

2	144
2	72
2	36
2	18
3	9
3	3
	1

2	384
2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

$$180 = 2 \times 2 \times 3 \times 3 \times 5 = 2^2 \times 3^2 \times 5$$

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$$

$$384 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$= 2^7 \times 3$$

$$\text{So, LCM} = 2^7 \times 3^2 \times 5 = 5760$$

(f)

2	108
2	54
3	27
3	9
3	3
	1

3	135
3	45
3	15
5	5
	1

3	162
3	54
3	18
3	6
2	2
	1

$$108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$$

$$135 = 3 \times 3 \times 3 \times 5 = 3^3 \times 5$$

$$162 = 3 \times 3 \times 3 \times 3 \times 2 = 3^4 \times 2$$

$$\text{So, LCM} = 2^2 \times 3^4 \times 5 = 1620$$

(g)

2	106
53	53
	1

3	159
53	53
	1

7	371
53	53
	1

$$106 = 2 \times 53$$

$$159 = 3 \times 53$$

$$371 = 7 \times 53$$

$$\text{So, LCM} = 2 \times 3 \times 7 \times 53 = 2226$$

(h)

3	45
3	15
5	5
	1

3	105
5	35
7	7
	1

2	180
2	90
3	45
3	15
5	5
	1

$$45 = 3 \times 3 \times 5 = 3^2 \times 5$$

$$105 = 3 \times 5 \times 7$$

$$180 = 2 \times 2 \times 3 \times 3 \times 5 = 2^2 \times 3^2 \times 5$$

$$\text{So, LCM} = 3^2 \times 2^2 \times 5 \times 7 = 1260$$

(i)

2	20
2	10
5	5
	1

5	25
5	5
	1

2	30
3	15
5	5
	1

2	40
2	20
2	10
5	5
	1

$$20 = 2 \times 2 \times 5 = 2^2 \times 5$$

$$25 = 5 \times 5 = 5^2$$

$$30 = 2 \times 3 \times 5$$

$$40 = 2 \times 2 \times 2 \times 5 = 2^3 \times 5$$

$$\text{So, LCM} = 2^3 \times 5^2 \times 3 = 600$$

(j)

2	150
3	75
5	25
5	5
	1

3	225
3	75
5	25
5	5
	1

3	375
5	125
5	25
5	5
	1

$$150 = 2 \times 3 \times 5 \times 5 = 2 \times 3 \times 5^2$$

$$225 = 3 \times 3 \times 5 \times 5 = 3^2 \times 5^2$$

$$375 = 3 \times 5 \times 5 \times 5 = 3 \times 5^3$$

$$\text{So, LCM} = 3^2 \times 5^3 \times 2 = 2250$$

(k)

2	112
2	56
2	28
2	14
7	7
	1

2	168
2	84
2	42
3	21
7	7
	1

2	266
7	133
19	19
	1

$$112 = 2 \times 2 \times 2 \times 2 \times 7 = 2^4 \times 7$$

$$168 = 2 \times 2 \times 2 \times 3 \times 7 = 2^3 \times 3 \times 7$$

$$266 = 2 \times 7 \times 19$$

$$\text{So, LCM} = 2^4 \times 3 \times 7 \times 19 = 6384$$

(l)

2	80
2	40
2	20
2	10
5	5
	1

2	120
2	60
2	30
3	15
5	5
	1

2	180
2	90
3	45
3	15
5	5
	1

$$80 = 2 \times 2 \times 2 \times 2 \times 5 = 2^4 \times 5$$

$$120 = 2 \times 2 \times 2 \times 3 \times 5 = 2^3 \times 3 \times 5$$

$$180 = 2 \times 2 \times 3 \times 3 \times 5 = 2^2 \times 3^2 \times 5$$

$$\text{So, LCM} = 2^4 \times 3^2 \times 5 = 720$$

3. (a)

2	22, 54, 108, 135
3	11, 27, 54, 135
3	11, 9, 18, 45
3	11, 3, 6, 15
	11, 1, 2, 5

$$\text{So, LCM} = 2 \times 3 \times 3 \times 3 \times 11 \times 2 \times 5 = 5940$$

(b)

2	49, 99, 108, 144
2	49, 99, 54, 72
3	49, 99, 27, 36
3	49, 33, 9, 12
	49, 11, 3, 4

$$\text{So, LCM} = 2 \times 2 \times 3 \times 3 \times 49 \times 11 \times 3 \times 4 = 232848$$

(c)

2	36, 60, 84, 90
2	18, 30, 42, 45
3	9, 15, 21, 45
3	3, 5, 7, 15
5	1, 5, 7, 5
	1, 1, 7, 1

$$\text{So, LCM} = 2 \times 2 \times 3 \times 3 \times 5 \times 7 = 1260$$

(d)

2	35, 105, 140, 180
2	35, 105, 70, 90
3	35, 105, 35, 45
5	35, 35, 35, 15
7	7, 7, 7, 3
	1, 1, 1, 3

$$\text{So, LCM} = 2 \times 2 \times 3 \times 5 \times 7 \times 3 = 1260$$

(e)

2	68, 119, 120, 140
2	34, 119, 60, 70
7	17, 119, 30, 35
5	17, 17, 30, 5
17	17, 17, 6, 1
2	1, 1, 6, 1
	1, 1, 3, 1

$$\text{So, LCM} = 2 \times 2 \times 7 \times 5 \times 17 \times 2 \times 3 = 14280$$

(f)

2	90, 120, 150, 160
2	45, 60, 75, 80
2	45, 30, 75, 40
3	45, 15, 75, 20
5	15, 5, 25, 20
	3, 1, 5, 4

$$\text{So, LCM} = 2 \times 2 \times 2 \times 3 \times 5 \times 3 \times 5 \times 4 = 7200$$

(g)

3	225, 150, 300, 375
5	75, 50, 100, 125
5	15, 10, 20, 25
2	3, 2, 4, 5
	3, 1, 2, 5

$$\text{So, LCM} = 3 \times 5 \times 5 \times 2 \times 3 \times 2 \times 5 = 4500$$

(h)

3	45, 108, 144, 180
3	15, 36, 48, 60
2	5, 12, 16, 20
2	5, 6, 8, 10
5	5, 3, 4, 5
3	1, 3, 4, 1
	1, 1, 4, 1

$$\text{So, LCM} = 3 \times 3 \times 2 \times 2 \times 5 \times 3 \times 4 = 2160$$

(i)

2	52, 78, 108, 117
2	26, 39, 54, 117
3	13, 39, 27, 117
13	13, 13, 9, 39
3	1, 1, 9, 3
	1, 1, 3, 1

$$\text{So, LCM} = 2 \times 2 \times 3 \times 13 \times 3 \times 3 = 1404$$

(j)

2	45, 64, 96, 120, 144
2	45, 32, 48, 60, 72
2	45, 16, 24, 30, 36
2	45, 8, 12, 15, 18
3	45, 4, 6, 15, 9
3	15, 4, 2, 5, 3
5	5, 4, 2, 5, 1
2	1, 4, 2, 1, 1
	1, 2, 1, 1, 1

So, LCM = $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 2 \times 2$
= 2880

(k)

2	180, 144, 200, 240
2	90, 72, 100, 120
2	45, 36, 50, 60
2	45, 18, 25, 30
3	45, 9, 25, 15
3	15, 3, 25, 5
5	5, 1, 25, 5
	1, 1, 5, 1

So, LCM = $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$
= 3600

(l)

2	350, 108, 54, 220
2	175, 54, 27, 110
3	175, 27, 27, 55
5	175, 9, 9, 55
9	35, 9, 9, 11
	35, 1, 1, 11

So, LCM = $2 \times 2 \times 3 \times 5 \times 9 \times 35 \times 11$
= 207900

4. The required least number is (LCM of 45, 108, 144 and 180) + 12

2	45, 108, 144, 180
2	45, 54, 72, 90
3	45, 27, 36, 45
3	15, 9, 12, 15
5	5, 3, 4, 5
	1, 3, 4, 1

LCM = $2 \times 2 \times 3 \times 3 \times 5 \times 3 \times 4$
= 2160

So, required number = 2160 + 12
= 2172

5. The required least number is (LCM of 112, 168, 266 and 399) + 11

2	112, 168, 266, 399
2	56, 84, 133, 399
2	28, 42, 133, 399
3	14, 21, 133, 399
7	14, 7, 133, 133
19	2, 1, 19, 19
	2, 1, 1, 1

LCM = $2 \times 2 \times 2 \times 3 \times 7 \times 19 \times 2 = 6384$

So, required number = 6384 + 11 = 6395

6. The required least number is (LCM of 18, 24, 64 and 108) - 3

2	18, 24, 64, 108
2	9, 12, 32, 54
3	9, 6, 16, 27
3	3, 2, 16, 9
2	1, 2, 16, 3
	1, 1, 8, 3

LCM = $2 \times 2 \times 3 \times 3 \times 2 \times 8 \times 3 = 1728$

So, required number = 1728 - 3 = 1725

7.

2	36, 60, 75, 180
2	18, 30, 75, 90
3	9, 15, 75, 45
3	3, 5, 25, 15
5	1, 5, 25, 5
	1, 1, 5, 1

LCM = $2 \times 2 \times 3 \times 3 \times 5 \times 5 = 900$

$$\begin{array}{r} 900 \overline{) 99999} \{ 111 \\ -900 \\ \hline 999 \\ -900 \\ \hline 999 \\ -900 \\ \hline 99 \end{array}$$

So, required number of

5-digit is 99999 - 99 = 99900

⇒ EXERCISE 3.7

1. Container of maximum capacity is the HCF of 850 l and 680 l.

$$\begin{array}{r} 680 \overline{) 850} \{ 1 \\ -680 \\ \hline 170 \overline{) 680} \{ 4 \\ -680 \\ \hline 0 \end{array}$$

So, required container is of 170 l.

2. Length of longest tape is the HCF of 185 m and 145 m.

$$\begin{array}{r}
 145 \overline{)185} (1 \\
 \underline{-145} \\
 40 \overline{)145} (3 \\
 \underline{-120} \\
 25 \overline{)40} (1 \\
 \underline{-25} \\
 15 \overline{)25} (1 \\
 \underline{-15} \\
 10 \overline{)15} (1 \\
 \underline{-10} \\
 5 \overline{)10} (2 \\
 \underline{-10} \\
 0
 \end{array}$$

So, length of required tape is 5 m.

3. Container of maximum capacity is the HCF of 403 l, 434 l and 465 l.

$$\begin{array}{r}
 403 \overline{)434} (1 \\
 \underline{-403} \\
 31 \overline{)403} (13 \\
 \underline{-31} \\
 93 \\
 \underline{-93} \\
 0
 \end{array}
 \qquad
 \begin{array}{r}
 31 \overline{)465} (15 \\
 \underline{-31} \\
 155 \\
 \underline{-155} \\
 0
 \end{array}$$

So, capacity of required container is 31 l.

4. Minimum distance is the LCM of 63 cm, 70 cm and 77 cm.

7	63, 70, 77
	9, 10, 11

So, $LCM = 7 \times 9 \times 10 \times 11 = 6930$

So, minimum distance is 6930 cm or 69.30 m.

- 5.

3	9, 15, 18
3	3, 5, 6
	1, 5, 2

$$LCM = 3 \times 3 \times 5 \times 2 = 90$$

They will ring after 90 minutes or 12:15 p.m.

- 6.

2	48, 72, 108
2	24, 36, 54
2	12, 18, 27
3	6, 9, 27
3	2, 3, 9
	2, 1, 3

$$\begin{aligned}
 LCM &= 2 \times 2 \times 2 \times 3 \times 3 \times 2 \times 3 \\
 &= 432 \text{ seconds} \\
 &= 7 \text{ min } 12 \text{ seconds}
 \end{aligned}$$

So, height will change simultaneously again at 8 : 07 : 12 a.m.

- 7.

2	60, 75, 90, 108
2	30, 75, 45, 54
3	15, 75, 45, 27
3	5, 25, 15, 9
5	5, 25, 5, 3
	1, 5, 1, 3

$$LCM = 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 3 = 2700$$

So, least distance is 2700 cm or 27m.

EXERCISE 3.8

1. $LCM \times HCF = \text{Product of numbers}$

$$\begin{aligned}
 \therefore HCF &= \frac{\text{Product of numbers}}{LCM} \\
 &= \frac{64}{16} = 4
 \end{aligned}$$

2. One number \times other number = $LCM \times HCF$

$$\begin{aligned}
 \text{Other number} &= \frac{LCM \times HCF}{\text{One number}} \\
 &= \frac{2175 \times 145}{725} = 435
 \end{aligned}$$

3. $LCM = \frac{\text{Product of numbers}}{HCF}$

$$= \frac{167475}{29} = 5775$$

4. $2923 \overline{)3239} (1$

$$\begin{array}{r}
 \underline{-2923} \\
 316 \overline{)2923} (9 \\
 \underline{-2844} \\
 79 \overline{)316} (4 \\
 \underline{-316} \\
 0
 \end{array}$$

So, HCF of 2923 and 3239 is 79.

$$\begin{aligned}
 \text{Now, } LCM &= \frac{2923 \times 3239}{79} \\
 &= 119843
 \end{aligned}$$

5. $HCF = \frac{\text{One number} \times \text{other number}}{LCM}$

$$\begin{aligned}
 &= \frac{861 \times 1353}{9471} \\
 &= 123
 \end{aligned}$$

6. $HCF = \frac{\text{One number} \times \text{other number}}{LCM}$

$$\begin{aligned}
 &= \frac{85 \times 1615}{1615} \\
 &= 85
 \end{aligned}$$

⇒ **HOTS**

1. Given in answersheet.
2. Given in answersheet.

⇒ **NCERT CORNER**

1. (a) $44 = 7 + 37$ or $3 + 41$ or $31 + 13$
 (b) $36 = 23 + 13$ or $31 + 5$ or $19 + 17$
 (c) $24 = 17 + 7$ or $11 + 13$ or $5 + 19$
 (d) $18 = 11 + 7$ or $13 + 5$
2. (a) 5445
 Sum of digits at odd places from the right
 $= 5 + 4 = 9$.
 Sum of the digits at even places from the right
 $= 4 + 5 = 9$.
 \therefore Difference of these two sums $= 9 - 9 = 0$.
 \therefore 5445 is divisible by 11.
 (b) 10824
 Sum of the digits at odd places from the right
 $= 4 + 8 + 1 = 13$
 Sum of the digits at even places from the right
 $= 2 + 0 = 2$
 \therefore Difference of these two sums $= 13 - 2 = 11$.
 \therefore 11 is a multiple of 11.
 \therefore 10824 is divisible by 11.
 (c) 7138965
 Sum of digits at odd places from the right
 $= 5 + 9 + 3 + 7 = 24$
 Sum of digits at even places from the right
 $= 6 + 8 + 1 = 15$
 Difference of these two sums $= 24 - 15 = 9$.
 \therefore 9 is not a multiple of 11.
 \therefore 7138965 is not divisible by 11.
 (d) 70169308
 Sum of the digits at odd places from the right
 $= 8 + 3 + 6 + 0 = 17$
 Sum of the digits at even places from the right
 $= 0 + 9 + 1 + 7 = 17$
 \therefore Difference of these two sums $= 17 - 17 = 0$.
 \therefore 70169308 is divisible by 11.
 (e) 10000001
 Sum of the digits at odd places from the right
 $= 1 + 0 + 0 + 0 = 1$
 Sum of the digits at even places from the right
 $= 0 + 0 + 0 + 1 = 1$
 \therefore Difference of these two sums $= 1 - 1 = 0$.
 \therefore 10000001 is divisible by 11.

- (f) 901153
 The sum of digits at odd places from the right
 $= 3 + 1 + 0 = 4$
 The sum of digits at even places from the right
 $= 5 + 1 + 9 = 15$
 \therefore Difference of these two sums $= 15 - 4 = 11$,
 which is a multiple of 11.
 \therefore 901153 is divisible by 11.
3. (a) 18 and 35
 Factors of 18 are 1, 2, 3, 6, 9 and 18.
 Factors of 35 are 1, 5, 7 and 35.
 \therefore Common factor of 18 and 35 is 1 (only).
 \therefore 18 and 35 are co-prime numbers.
 (b) 15 and 37
 Factors of 15 are 1, 3, 5 and 15.
 Factors of 37 are 1 and 37.
 \therefore Common factor of 15 and 37 is 1 (only).
 \therefore 15 and 37 are co-prime numbers.
 (c) 30 and 415
 Factors of 30 are 1, 2, 3, 5, 6, 10, 15 and 30.
 Factors of 415 are 1, 5, 83 and 415.
 \therefore Common factors of 30 and 415 are 1 and 5.
 They have two common factors.
 \therefore 30 and 415 are not co-prime numbers.
 (d) 17 and 68
 Factors of 17 are 1 and 17.
 Factors of 68 are 1, 2, 4, 17, 34 and 68.
 \therefore Common factors of 17 and 68 are 1 and 17.
 They have two common factors.
 \therefore 17 and 68 are not co-prime numbers.
 (e) 216 and 215
 Factors of 216 are 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 27, 36, 54, 72, 108 and 216.
 Factors of 215 are 1, 5, 43 and 215.
 \therefore Common factor of 216 and 215 is 1 (only).
 \therefore 216 and 215 are co-prime numbers.
 (f) 81 and 16
 Factors of 81 are 1, 3, 9, 27 and 81.
 Factors of 16 are 1, 2, 4, 8 and 16.
 \therefore Common factor of 81 and 16 is 1 (only).
 \therefore 81 and 16 are co-prime numbers.
4. The number that is divisible by 12 will also be divisible by the factors of 12.
 Factors of 12 are 1, 2, 3, 4, 6 and 12.
5. **Example 1 :** Let two consecutive odd numbers be 9 and 11.

Sum of 9 and 11 = 20, which is divisible by 4.

Example 2 : Let two consecutive odd numbers be 51 and 53.

Sum of 51 and 53 = 104, which is divisible by 4.

Therefore, it is verified that the sum of two consecutive odd numbers is divisible by 4.

6. No, the answer is not correct. The correct answer is : HCF of 4 and 15 is 1.

That is why because 0 cannot be a factor of any number and 1 is a factor of every number.

4 Basic Geometrical Ideas

EXERCISE 4.1

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.

EXERCISE 4.2

- Opposite edges of black board, opposite edges of room, edges of door.
- Do it yourself.
- Given in answersheet.
- Given in answersheet.
- $m \parallel l$
So $RS = PQ = 3.2$ cm
- Given in answersheet.

EXERCISE 4.3

- Given in answersheet.
- Do it yourself.
- Do it yourself.
- Given in answersheet.
- Given in answersheet.
- $\angle 1 = \angle ACD$ $\angle 2 = \angle ABD$
 $\angle 3 = \angle CAD$ $\angle 4 = \angle BAD$
 $\angle 5 = \angle ADC$ $\angle 6 = \angle ADB$
- Given in answersheet.

EXERCISE 4.4

- Given in answersheet.

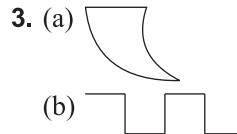
- Given in answersheet.
- Do it yourself.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Do it yourself.

HOTS

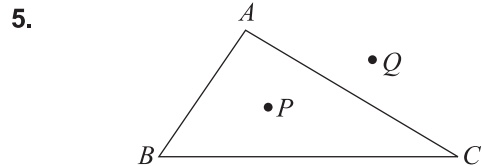
- Given in answersheet.
- Given in answersheet.

NCERT CORNER

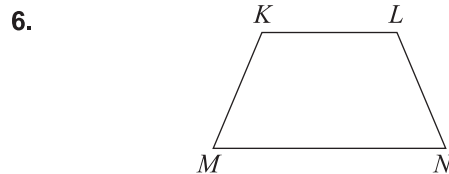
- (a) An infinite number of lines can pass through one given point.
(b) Only one line can pass through two given points.
- (a) Yes, it is a curve.
(b) Yes, it is a closed curve.



- (c) A polygon with two sides is not possible.
- (a) Point A
(b) Points C, A, D
(c) Points E, B, O, F



Point A is neither in the exterior nor in the interior of ΔABC . It lies on ΔABC .



- (a) $\overline{KL}, \overline{MN}$ and $\overline{KM}, \overline{LN}$ (b) $\angle K, \angle M$ and $\angle N, \angle L$
(c) $\overline{KM}, \overline{MN}$ and $\overline{KL}, \overline{LN}$ (d) $\angle M, \angle N$ and $\angle K, \angle L$
- Given in answersheet.

5 Understanding Elementary Shapes

EXERCISE 5.1

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.

4. Given in answersheet.
5. Given in answersheet.
6. Given in answersheet.

⇒ **EXERCISE 5.2**

1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. Given in answersheet.
5. Given in answersheet.

⇒ **EXERCISE 5.3**

1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. (a) $40^\circ + 50^\circ + 90^\circ = 180^\circ$
Triangle can be formed.
- (b) $90^\circ + 90^\circ + 60^\circ = 240^\circ$
Triangle cannot be formed.
- (c) $110^\circ + 50^\circ + 40^\circ = 200^\circ$
Triangle cannot be formed.
- (d) $30^\circ + 70^\circ + 80^\circ = 180^\circ$
Triangle can be formed.
5. Given in answersheet.
6. Let measure of third angle be x° .
So, $48^\circ + 105^\circ + x^\circ = 180^\circ$
 $153^\circ + x^\circ = 180^\circ$
 $x^\circ = 180^\circ - 153^\circ$
 $x^\circ = 27^\circ$
7. Let measure of third angle be x°
So, $30^\circ + 60^\circ + x^\circ = 180^\circ$
 $90^\circ + x^\circ = 180^\circ$
 $x^\circ = 180^\circ - 90^\circ$
 $x^\circ = 90^\circ$
8. Let measure of equal angle be x° .
So, $80^\circ + x^\circ + x^\circ = 180^\circ$
 $2x^\circ = 180^\circ - 80^\circ$
 $2x^\circ = 100^\circ$
 $x^\circ = 50^\circ$
9. Ratio of angles = 2 : 3 : 4
So, angles are $(2x)^\circ$, $(3x)^\circ$ and $(4x)^\circ$
So, $2x^\circ + 3x^\circ + 4x^\circ = 180^\circ$
 $9x = 180^\circ$
 $\therefore x = \frac{180^\circ}{9}$
 $= 20^\circ$
 $\therefore 40^\circ, 60^\circ, 80^\circ$.

10. Let $2\angle P = 3\angle Q = 6\angle R = k$

$$\therefore \angle P = \frac{k}{2}, \angle Q = \frac{k}{3} \text{ and } \angle R = \frac{k}{6}$$

$$\angle P + \angle Q + \angle R = 180^\circ$$

$$\frac{k}{2} + \frac{k}{3} + \frac{k}{6} = 180^\circ$$

$$\frac{3k + 2k + k}{6} = 180^\circ$$

$$\frac{6k}{6} = 180^\circ$$

$$k = 180^\circ$$

$$\angle P = \frac{180^\circ}{2} = 90^\circ$$

$$\angle Q = \frac{180^\circ}{3} = 60^\circ$$

$$\angle R = \frac{180^\circ}{6} = 30^\circ$$

11. In $\triangle ABD$
 $\angle DAB + \angle ABD + \angle ADB = 180^\circ$... (1)
In $\triangle CBD$
 $\angle BDC + \angle DCB + \angle DBC = 180^\circ$... (2)
On adding eq. (1) and (2)
 $\angle DAB + \angle ABD + \angle ADB + \angle BDC + \angle DCB$
 $+ \angle DBC = 180^\circ + 180^\circ$
 $= 360^\circ$
12. Given in answersheet.
13. Given in answersheet.
14. Given in answersheet.
15. Given in answersheet.

⇒ **EXERCISE 5.4**

1. Given in answersheet.
2. The length of diagonals are different and each adjacent angle is not of 90° in rhombus.
3. Opposite sides are equal and parallel.
4. Ratio of angles = 1 : 2 : 3 : 4
Let angles be x° , $(2x)^\circ$, $(3x)^\circ$ and $(4x)^\circ$.
So, $x^\circ + 2x^\circ + 3x^\circ + 4x^\circ = 360^\circ$
 $10x^\circ = 360^\circ$
 $\therefore x^\circ = \frac{360^\circ}{10}$
 $x^\circ = 36^\circ$
 \therefore angles are $36^\circ, 72^\circ, 108^\circ$ and 144° .
5. Ratio of angles = 4 : 5 : 4 : 5
So, angles are $(4x)^\circ$, $(5x)^\circ$, $(4x)^\circ$ and $(5x)^\circ$
 $4x^\circ + 5x^\circ + 4x^\circ + 5x^\circ = 360^\circ$
 $18x^\circ = 360^\circ$

$$\therefore x = \frac{360^\circ}{18}$$

$$x = 20^\circ$$

So, angles are 80° , 100° , 80° and 100° .

6. Ratio of sides are 3 : 5

Let sides be $3x$ and $5x$

So, perimeter of rhombus = 96 cm

$$2(3x + 5x) = 96$$

$$2 \times 8x = 96$$

$$16x = 96$$

$$x = \frac{96}{16}$$

So, length of sides are 18 cm and 30 cm.

7. Given in answersheet.
8. Given in answersheet.
9. Given in answersheet.

⇒ HOTS

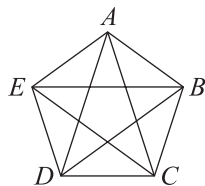
1. Given in answersheet.
2. Given in answersheet.

⇒ NCERT CORNER

1. Since, $AG = 7 \text{ cm} - 1 \text{ cm} = 6 \text{ cm}$,
 $AD = 4 \text{ cm} - 1 \text{ cm} = 3 \text{ cm}$
 $DG = 7 \text{ cm} - 4 \text{ cm} = 3 \text{ cm}$
 $\therefore AG = AD + DG$

Thus, D is the mid-point of AG .

2. (a) 1 right angle
(b) 2 right angles
(c) 3 right angles
(d) 1 right angle
(e) 3 right angles
(f) 2 right angles
3. Given in answersheet.
4. (a) 81° and 25° are acute angles.
(b) 100° and 118° are obtuse angles.
5. $\therefore PQ \perp XY$
 \therefore Angle between them = $\angle PAY = 90^\circ$.
6. Given in answersheet.
7. Given in answersheet.
8. Diagonals are \overline{AD} , \overline{AC} , \overline{BE} , \overline{BD} and \overline{EC} .



⇒ EXERCISE 6.1

1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. (a) $5 + (-4) = 5 - 4 = 1$
(b) $3 + (-3) = 3 - 3 = 0$
(c) $4 - 7 = -3$
(d) $6 + (-8) = 6 - 8 = -2$
(e) $6 - 10 = -4$
(f) $-5 - 5 = -10$
(g) $4 + (-6) = 4 - 6 = -2$
(h) $3 + (-15) = 3 - 15 = -12$
5. Given in answersheet.
6. Given in answersheet.
7. Given in answersheet.
8. Given in answersheet.
9. (a) $5 - |-6| + |8| = 5 - 6 + 8 = 7$
(b) $|-8| - |-8| + |16| = 8 - 8 + 16 = 16$
(c) $|23| + |-8| + |-11| = 23 + 8 + 11 = 42$
(d) $|14| + |16| - |-14| - |-16| = 14 + 16 - 14 - 16 = 0$
(e) $|10| - |-25| + |5| = 10 - 25 + 5 = -10$
(f) $|-16| - |-13| + |-23| - |47| = 16 - 13 + 23 - 47 = -21$
(g) $|5| + |-11| - |16| = 5 + 11 - 16 = 0$
(h) $|-237| + |-167| - |178| = 237 + 167 - 178 = 226$
10. Given in answersheet.

⇒ EXERCISE 6.2

1. Given in answersheet.
2. (a) $(-13) + (-18) = -(13 + 18) = -31$
(b) $(-10) + (-6) + 41 = -16 + 41 = +25$
(c) $(-250) + 160 = -90$
(d) $(-389) + (-163) = -(389 + 163) = -552$
(e) $(-93) + 169 = 76$
(f) $3062 + (-4064) = -1002$
(g) $37 + (-18) + (-16) = 37 - (18 + 16) = 37 - 34 = 3$
(h) $71 + (-16) + (-53) = 71 - (16 + 53) = 71 - 69 = 2$
3. (a) $(-16) + 17 + (-32) + 47 + 46 = (17 + 47 + 46) - (16 + 32) = 110 - 48 = 62$

(b) $906 + (-9) + (-1) + (-138)$
 $= 906 - (9 + 1 + 138)$
 $= 906 - 148 = 758$

(c) $1056 + (-786) + (-48) + (-150)$
 $= 1056 - (786 + 48 + 150)$
 $= 1056 - 984 = 72$

(d) $1000 + (-514) + 517 + (-999)$
 $= (1000 + 517) - (514 + 999)$
 $= 1517 - 1513 = 4$

(e) $(-1) + (-304) + 168 + (-618)$
 $= -(1 + 304 + 618) + 168$
 $= -923 + 168 = -755$

(f) $(-243) + 27 + (-9) + 729 + (-1)$
 $= (-243 + 9 + 1) + (27 + 729)$
 $= -253 + 756 = 503$

4. Given in answersheet.

5. Given in answersheet.

6. Given in answersheet.

7. (a) $x + 27 = 0$

$$x + 27 + (-27) = 0 + (-27)$$

$$x = -27$$

(b) $x + 46 = 0$

$$x + 46 + (-46) = 0 - 46$$

$$x = -46$$

(c) $-15 + x + (15) = 0 + 15$

$$x = 15$$

(d) $x - 23 + 23 = 0 + 23$

$$x = 23$$

(e) $16 + x + (-16) = 0 - 16$

$$x = -16$$

(f) $x + (-61) + 61 = 0 + 61$

$$x = 61$$

8. Given in answersheet.

⇒ **EXERCISE 6.3**

1. (a) $(-4) + (-6) \dots\dots (-4) - (-6)$

$$(-4) + (-6) = -10$$

$$(-4) - (-6) = -4 + 6 = 2$$

$$\therefore -10 < 2$$

$$\therefore (-4) + (-6) < (-4) - (-6)$$

(b) $31 - (-42) \dots\dots 17 + (-48)$

$$31 - (-42) = 31 + 42 = 73$$

$$17 + (-48) = -31$$

$$\therefore 73 > -31$$

$$\therefore 31 - (-42) > 17 + (-48)$$

(c) $45 - (-11) \dots\dots 35 - (-21)$

$$45 - (-11) = 45 + 11 = 56$$

$$35 - (-21) = 35 + 21 = 56$$

$$\therefore 56 = 56$$

$$\therefore 45 - (-11) = 35 - (-21)$$

(d) $(-63) + (-32) \dots\dots 18 + (-38)$

$$(-63) + (-32) = -95$$

$$18 + (-38) = -20$$

$$\therefore -95 < -20$$

$$\therefore (-63) + (-32) < 18 + (-38)$$

(e) $(-21) - (-10) \dots\dots (-21) + 10$

$$(-21) - (-10) = -21 + 10 = -11$$

$$-21 + 10 = -11$$

$$\therefore -11 = -11$$

$$\therefore (-21) - (-10) = (-21) + 10$$

(f) $(12) - (-12) \dots\dots (-12) - (12)$

$$12 - (-12) = 12 + 12 = 24$$

$$(-12) - (12) = -12 - 12 = -24$$

$$\therefore 24 > -24$$

$$\therefore (12) - (-12) > (-12) - (12)$$

2. (a) 826 from -81

$$-81 - (826) = -81 - 826$$

$$= -907$$

(b) -316 from -418

$$-418 - (-316) = -418 + 316$$

$$= -102$$

(c) 718 from -12

$$-12 - 718 = -730$$

(d) -63 from 123

$$123 - (-63) = 123 + 63$$

$$= 186$$

(e) 312 from -415

$$-415 - 312 = -727$$

(f) -98 from -613

$$-613 - (-98) = -613 + 98$$

$$= -515$$

(g) -412 from 0

$$0 - (-412) = 0 + 412 = 412$$

(h) 8163 from -786

$$-786 - 8163 = -8949$$

3. (a) $(-7) - 8 - (-25) = -7 - 8 + 25$

$$= -15 + 25 = 10$$

(b) $(-12) - [(-15) + (-3) - 4]$

$$= (-12) - [-15 - 3 - 4]$$

$$= -12 - [-22]$$

$$= -12 + 22 = 10$$

$$(c) 50 - (-40) - (-4) = 50 + 40 + 4 = 94$$

$$(d) (-93) - (-61) + 37 = -93 + 61 + 37 \\ = -93 + 98 = 5$$

$$(e) 50 - (-48) - (-17) = 50 + 48 + 17 = 115$$

$$(f) (-7) + (-8) - (-86) = -7 - 8 + 86 \\ = -15 + 86 = 71$$

$$(g) (-13) + 42 - 18 + (-6) = -13 + 42 - 18 - 6 \\ = 42 - 37 = 5$$

$$(h) 42 + (-73) + (-89) = 42 - 73 - 89 \\ = 42 - 162 = -120$$

$$4. 1058 - [584 + (-376)] = 1058 - (208) = 850$$

$$5. (-416 - 519) - [-674 - 216] = -935 - [-890] \\ = -935 + 890 = -45$$

$$6. -69 + [6 - (-74)] = -69 + [6 + 74] \\ = -69 + 80 = 11$$

$$7. 10 - (-18) = 10 + 18 = 28 \\ -18 - 10 = -28$$

No, they are not equal.

$$8. \text{Sum of two integers} = -113$$

$$\text{One of them} = 69$$

$$\text{Other integer} = -113 - 69 = -182$$

$$9. \text{Sum of two integers} = 783$$

$$\text{One of them} = -318$$

$$\text{Other integer} = 783 - (-318) = 783 + 318 = 1101$$

$$10. \text{Temperature at 10 a.m.} = -14^\circ\text{C}$$

$$\text{Temperature at 4 a.m.} = -34^\circ\text{C}$$

$$\text{Difference in temperature} = -14^\circ\text{C} - (-34^\circ\text{C}) \\ = -14^\circ\text{C} + 34^\circ = 20^\circ\text{C}$$

EXERCISE 6.4

1. Do it yourself.

2. Do it yourself.

3. Do it yourself.

4. Given in answersheet.

$$5. (a) (-5) \times (-6) \times 8 = +30 \times 8 = 240$$

$$(b) (-13) \times (-5) \times 4 = -13 \times (-20) = +260$$

$$(c) (-17) \times (-10) \times (-12) = -2040$$

$$(d) 38 \times (-17) \times (-5) = -190 \times (-17) = +3230$$

$$(e) (-8) \times 0 \times (-37) = 0$$

$$(f) (-16) \times 4 \times (-5) = -16 \times (-20) = 320$$

$$(g) (-15) \times 14 \times (-10) = +2100$$

$$(h) 4 \times 6 \times (-15) = 4 \times (-90) = -360$$

$$6. (a) 54 \times (-45) + 54 \times (-5) = 54 \times (-45 - 5) \\ = 54 \times (-50) = -2700$$

$$(b) (-183) \times (-37) + (-183) \times 17 \\ = -183 \times (-37 + 17) \\ = -183 \times (-20) = +3660$$

$$(c) 16 \times (-7) + 3 \times 7 = 7 \times (-16 + 3) \\ = 7 \times -13 = -91$$

$$(d) 69 \times 37 + 37 \times (-59) = 37 \times (69 - 59) \\ = 37 \times 10 = 370$$

$$(e) 41 \times (-42) + 59 \times (-42) = -42 \times (41 + 59) \\ = -42 \times 100 = -4200$$

$$(f) 3178 \times (-10) + 3178 \times (-16) \\ = 3178 \times (-10 - 16) \\ = 3178 \times (-26) = -82628$$

7. Given in answersheet.

EXERCISE 6.5

1. Given in answersheet.

2. Given in answersheet.

HOTS

1. Given in answersheet.

$$2. \text{Temperature in Sahara desert} = +136^\circ\text{F}$$

$$\text{Temperature in Gobi desert} = -50^\circ\text{F}$$

Difference between two temperatures

$$= +136^\circ - (-50^\circ)$$

$$= +136^\circ + 50^\circ = 186^\circ\text{F}$$

$$3. \text{Highest elevation in the world} = +29,028 \text{ feet}$$

$$\text{Lowest elevation in the world} = -1,312 \text{ feet}$$

Difference between two elevations

$$= +29,028 - (-1,312)$$

$$= +29,028 + 1,312$$

$$= 30,340$$

4. Given in answersheet.

NCERT CORNER

1. Given in answersheet.

2. (a) **Place** **Temperature**

$$\text{Siachin} \quad 10^\circ\text{C below } 0^\circ\text{C} \quad -10^\circ\text{C}$$

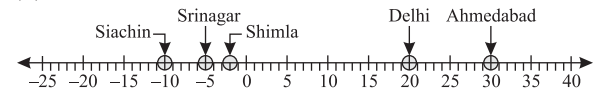
$$\text{Shimla} \quad 2^\circ\text{C below } 0^\circ\text{C} \quad -2^\circ\text{C}$$

$$\text{Ahmedabad} \quad 30^\circ\text{C above } 0^\circ\text{C} \quad +30^\circ\text{C}$$

$$\text{Delhi} \quad 20^\circ\text{C above } 0^\circ\text{C} \quad +20^\circ\text{C}$$

$$\text{Srinagar} \quad 5^\circ\text{C below } 0^\circ\text{C} \quad -5^\circ\text{C}$$

(b)



(c) Siachin is the coolest place.

(d) Delhi and Ahmedabad are the places where temperatures are above 10°C .

$$3. (a) 11 + (-7) = 4 + 7 + (-7) = 4 + 0 = 4$$

$$(b) (-13) + (+18) = (-13) + (+13) + (+5) = 0 + (+5) \\ = +5 = 5$$

$$\begin{aligned} \text{(c)} \quad (-10) + (+19) &= (-10) + (+10) + (+9) \\ &= 0 + (+9) \\ &= +9 = 9 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad (-250) + (+150) &= (-100) + (-150) + (+150) \\ &= (-100) + 0 = -100 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad (-380) + (-270) &= (-380) + (-270) \\ &= -650 \end{aligned}$$

$$\text{(f)} \quad (-217) + (-100) = -317$$

$$\begin{aligned} \text{4. (a)} \quad (-7) + (-9) + 4 + 16 &= (-16) + 4 + 16 \\ &= 4 + (-16) + 16 \\ &= 4 + 0 = 4 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad (37) + (-2) + (-65) + (-8) &= 37 + (-75) \\ &= 37 + (-37) + (-38) \\ &= 0 + (-38) = -38 \end{aligned}$$

7

Fractions

EXERCISE 7.1

1. Given in answersheet.

2. Do it yourself.

3. Given in answersheet.

4. (a) Three-sevenths

(b) Four-fifteenths

(c) Ten-seventeenths

(d) Eleven-thirteenths

(e) Thirteen-seventeenths

(f) Eleven-twenty thirds

5. Given in answersheet.

6. Given in answersheet.

7. Do yourself

$$\text{8. (a)} \quad \frac{1}{3} \text{ of 15 balls} = \frac{1}{3} \times 15 = 5 \text{ balls}$$

$$\text{(b)} \quad \frac{1}{3} \text{ of 24 balls} = \frac{1}{3} \times 24 = 8 \text{ balls}$$

$$\text{(c)} \quad \frac{1}{3} \text{ of 21 pens} = \frac{1}{3} \times 21 = 7 \text{ pens}$$

$$\text{(d)} \quad \frac{1}{3} \text{ of 27 balloons} = \frac{1}{3} \times 27 = 9 \text{ balloons}$$

$$\text{9. (a)} \quad \frac{2}{5} \text{ of 20 pencils} = \frac{2}{5} \times 20 = 8 \text{ pencils}$$

$$\text{(b)} \quad \frac{2}{5} \text{ of 25 books} = \frac{2}{5} \times 25 = 10 \text{ books}$$

$$\text{(c)} \quad \frac{2}{5} \text{ of 15 triangles} = \frac{2}{5} \times 15 = 6 \text{ triangles}$$

$$\text{(d)} \quad \frac{2}{5} \text{ of 30 apples} = \frac{2}{5} \times 30 = 12 \text{ apples}$$

10. 1 hour = 60 minutes

$$\text{So,} \quad \frac{25}{60} = \frac{5}{12}$$

11. 1 day = 24 hours

$$\text{So,} \quad \frac{9}{24} = \frac{3}{8}$$

12. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19

So total prime numbers are 8

$$\text{So,} \quad \frac{8}{19}$$

EXERCISE 7.2

1. Given in answersheet.

$$\text{2. (a)} \quad 9\frac{3}{8} = \frac{9 \times 8 + 3}{8} = \frac{75}{8}$$

$$\text{(b)} \quad 3\frac{2}{5} = \frac{3 \times 5 + 2}{5} = \frac{17}{5}$$

$$\text{(c)} \quad 3\frac{2}{7} = \frac{3 \times 7 + 2}{7} = \frac{23}{7}$$

$$\text{(d)} \quad 4\frac{1}{5} = \frac{4 \times 5 + 1}{5} = \frac{21}{5}$$

$$\text{(e)} \quad 5\frac{2}{7} = \frac{5 \times 7 + 2}{7} = \frac{37}{7}$$

$$\text{(f)} \quad 5\frac{1}{6} = \frac{5 \times 6 + 1}{6} = \frac{31}{6}$$

$$\text{(g)} \quad 16\frac{2}{5} = \frac{16 \times 5 + 2}{5} = \frac{82}{5}$$

$$\text{(h)} \quad 12\frac{3}{16} = \frac{12 \times 16 + 3}{16} = \frac{195}{16}$$

$$\text{(i)} \quad 5\frac{3}{10} = \frac{5 \times 10 + 3}{10} = \frac{53}{10}$$

$$\text{(j)} \quad 7\frac{1}{8} = \frac{7 \times 8 + 1}{8} = \frac{57}{8}$$

$$\text{3. (a)} \quad \frac{27}{5} \quad \begin{array}{r} 5 \overline{) 27} \\ \underline{-25} \\ 2 \end{array} \quad \therefore \quad \frac{27}{5} = 5\frac{2}{5}$$

$$\text{(b)} \quad \frac{23}{9} \quad \begin{array}{r} 9 \overline{) 23} \\ \underline{-18} \\ 5 \end{array} \quad \therefore \quad \frac{23}{9} = 2\frac{5}{9}$$

$$\text{(c)} \quad \frac{43}{8} \quad \begin{array}{r} 8 \overline{) 43} \\ \underline{-40} \\ 3 \end{array} \quad \therefore \quad \frac{43}{8} = 5\frac{3}{8}$$

$$\text{(d)} \quad \frac{43}{8} \quad \begin{array}{r} 12 \overline{) 55} \\ \underline{-48} \\ 7 \end{array} \quad \therefore \quad \frac{55}{12} = 4\frac{7}{12}$$

$$\begin{array}{l} \text{(e)} \frac{78}{15} \quad 15 \overline{)78} \begin{array}{r} 5 \\ -75 \\ \hline 3 \end{array} \quad \therefore \frac{78}{15} = 5 \frac{3}{15} \\ \text{(f)} \frac{125}{12} \quad 12 \overline{)125} \begin{array}{r} 10 \\ -120 \\ \hline 5 \end{array} \quad \therefore \frac{125}{12} = 10 \frac{5}{12} \\ \text{(g)} \frac{135}{7} \quad 7 \overline{)135} \begin{array}{r} 19 \\ -7 \\ \hline 65 \\ -63 \\ \hline 2 \end{array} \quad \therefore \frac{135}{7} = 19 \frac{2}{7} \\ \text{(h)} \frac{225}{12} \quad 12 \overline{)225} \begin{array}{r} 18 \\ -12 \\ \hline 105 \\ -96 \\ \hline 9 \end{array} \quad \therefore \frac{225}{12} = 18 \frac{9}{12} \\ \text{(i)} \frac{139}{15} \quad 15 \overline{)139} \begin{array}{r} 9 \\ -135 \\ \hline 4 \end{array} \quad \therefore \frac{139}{15} = 9 \frac{4}{15} \\ \text{(j)} \frac{215}{31} \quad 31 \overline{)215} \begin{array}{r} 6 \\ -186 \\ \hline 29 \end{array} \quad \therefore \frac{215}{31} = 6 \frac{29}{31} \end{array}$$

$$\begin{array}{l} \text{(d)} \frac{3}{7} = \frac{x}{35} \\ \Rightarrow 7 \times x = 3 \times 35 \\ \Rightarrow x = \frac{3 \times 35}{7} = 15 \\ \text{(e)} \frac{18}{24} = \frac{x}{4} \\ \Rightarrow x \times 24 = 18 \times 4 \\ \Rightarrow x = \frac{18 \times 4}{24} = 3 \\ \text{(f)} \frac{45}{60} = \frac{15}{x} \\ \Rightarrow 45 \times x = 15 \times 60 \\ \Rightarrow x = \frac{15 \times 60}{45} = 20 \\ \text{(g)} \frac{60}{82} = \frac{x}{20} \\ \Rightarrow 80 \times x = 60 \times 20 \\ \Rightarrow x = \frac{60 \times 20}{80} = 15 \\ \text{(h)} \frac{90}{110} = \frac{x}{11} \\ \Rightarrow x \times 110 = 90 \times 11 \\ \Rightarrow x = \frac{90 \times 11}{110} = 9 \end{array}$$

EXERCISE 7.3

$$\begin{array}{ll} 1. \text{ (a)} \frac{3}{9} = \frac{1}{3} & \text{(b)} \frac{1}{2} \\ \text{(c)} \frac{1}{3} & \text{(d)} \frac{4}{8} = \frac{1}{2} \\ \text{(e)} \frac{3}{9} = \frac{1}{3} & \text{(f)} \frac{2}{6} = \frac{1}{3} \end{array}$$

So, a , c , e , and f are equivalent and b , d are also equivalent.

$$\begin{array}{l} 2. \text{ (a)} \frac{3}{5} = \frac{x}{20} \\ \Rightarrow 5 \times x = 3 \times 20 \\ \Rightarrow x = \frac{3 \times 20}{5} = 12 \\ \text{(b)} \frac{4}{9} = \frac{16}{x} \\ \Rightarrow 4 \times x = 16 \times 9 \\ \Rightarrow x = \frac{16 \times 9}{4} = 36 \\ \text{(c)} \frac{5}{8} = \frac{x}{16} \\ \Rightarrow 8 \times x = 5 \times 16 \\ \Rightarrow x = \frac{5 \times 16}{8} = 10 \end{array}$$

$$\begin{array}{l} 3. \text{ (a)} \frac{4}{5} = \frac{4 \times 4}{5 \times 4} = \frac{16}{20} \\ \text{(b)} \frac{4}{5} = \frac{4 \times 9}{5 \times 4} = \frac{36}{45} \\ \text{(c)} \frac{4}{5} = \frac{4 \times 3}{5 \times 3} = \frac{12}{15} \\ \text{(d)} \frac{4}{5} = \frac{4 \times 12}{5 \times 12} = \frac{48}{60} \\ 4. \text{ (a)} \frac{6}{7} = \frac{6 \times 6}{7 \times 6} = \frac{36}{42} \\ \text{(b)} \frac{6}{7} = \frac{6 \times 11}{7 \times 11} = \frac{66}{77} \\ \text{(c)} \frac{6}{7} = \frac{6 \times 6}{7 \times 6} = \frac{36}{42} \\ \text{(d)} \frac{6}{7} = \frac{6 \times 9}{7 \times 9} = \frac{54}{63} \\ 5. \text{ (a)} \frac{48}{72} = \frac{48 \div 3}{72 \div 3} = \frac{16}{24} \\ \text{(b)} \frac{48}{72} = \frac{48 \div 2}{72 \div 2} = \frac{24}{36} \end{array}$$

$$(c) \frac{48}{72} = \frac{48 \div 3}{72 \div 3} = \frac{16}{24}$$

$$(d) \frac{48}{72} = \frac{48 \div 2}{72 \div 2} = \frac{24}{36}$$

$$6. (a) \frac{48}{60} = \frac{48 \div 12}{60 \div 12} = \frac{4}{5}$$

$$(b) \frac{72}{90} = \frac{72 \div 18}{90 \div 18} = \frac{4}{5}$$

$$(c) \frac{84}{98} = \frac{84 \div 14}{98 \div 14} = \frac{6}{7}$$

$$(d) \frac{150}{90} = \frac{150 \div 30}{90 \div 30} = \frac{5}{3}$$

$$(e) \frac{68}{119} = \frac{68 \div 17}{119 \div 17} = \frac{4}{7}$$

$$(f) \frac{96}{120} = \frac{96 \div 24}{120 \div 24} = \frac{4}{5}$$

$$(g) \frac{75}{120} = \frac{75 \div 15}{120 \div 15} = \frac{5}{8}$$

$$(h) \frac{135}{240} = \frac{135 \div 15}{240 \div 15} = \frac{9}{16}$$

$$7. \text{ Fraction of copies used by Vihor} = \frac{10}{20} = \frac{1}{2}$$

$$\text{Fraction of copies used by Meeku} = \frac{15}{30} = \frac{1}{2}$$

$$\text{Fraction of copies used by Saksham} = \frac{12}{24} = \frac{1}{2}$$

Yes, all fractions are equal.

$$8. \text{ Fraction of pencils used by Krista} = \frac{32}{48} = \frac{2}{3}$$

$$\text{Fraction of pencils used by Merry} = \frac{28}{42} = \frac{2}{3}$$

$$\text{Fraction of pencils used by Tina} = \frac{26}{39} = \frac{2}{3}$$

Yes, all fractions are equal.

EXERCISE 7.4

$$1. (a) \frac{7}{9}, \frac{11}{18}, \frac{5}{12}, \frac{17}{36}$$

2	9, 18, 12, 36
2	9, 9, 6, 18
3	9, 9, 3, 9
3	3, 3, 1, 3
	1, 1, 1, 1

$$\text{LCM} = 2 \times 2 \times 3 \times 3 = 36$$

$$\therefore \frac{7}{9} = \frac{7 \times 4}{9 \times 4} = \frac{28}{36}$$

$$\frac{11}{18} = \frac{11 \times 2}{18 \times 2} = \frac{22}{36}$$

$$\frac{5}{12} = \frac{5 \times 3}{12 \times 3} = \frac{15}{36}$$

$$\frac{17}{36} = \frac{17}{36}$$

So, $\frac{28}{36}, \frac{22}{36}, \frac{15}{36}, \frac{17}{36}$ are like fractions.

$$(b) \frac{3}{7}, \frac{4}{21}, \frac{5}{14}, \frac{1}{3}$$

3	7, 21, 14, 3
7	7, 7, 14, 1
	1, 1, 2, 1

$$\text{LCM} = 3 \times 7 \times 2 = 42$$

$$\therefore \frac{3}{7} = \frac{3 \times 6}{7 \times 6} = \frac{18}{42}$$

$$\frac{4}{21} = \frac{4 \times 2}{21 \times 2} = \frac{8}{42}$$

$$\frac{5}{14} = \frac{5 \times 3}{14 \times 3} = \frac{15}{42}$$

$$\frac{1}{3} = \frac{1 \times 14}{3 \times 14} = \frac{14}{42}$$

So, $\frac{18}{42}, \frac{8}{42}, \frac{15}{42}, \frac{14}{42}$ are like fractions.

$$(c) \frac{2}{15}, \frac{3}{12}, \frac{5}{18}, \frac{7}{9}$$

2	15, 12, 18, 9
3	15, 6, 9, 9
3	5, 2, 3, 3
	5, 2, 1, 1

$$\text{LCM} = 2 \times 3 \times 3 \times 5 \times 2 = 180$$

$$\therefore \frac{2}{15} = \frac{2 \times 12}{15 \times 12} = \frac{24}{180}$$

$$\frac{3}{12} = \frac{3 \times 15}{12 \times 15} = \frac{45}{180}$$

$$\frac{5}{18} = \frac{5 \times 10}{18 \times 10} = \frac{50}{180}$$

$$\frac{7}{9} = \frac{7 \times 20}{9 \times 20} = \frac{140}{180}$$

So, $\frac{24}{180}, \frac{45}{180}, \frac{50}{180}, \frac{140}{180}$ are like fractions.

$$(d) \frac{7}{10}, \frac{5}{18}, \frac{3}{15}, \frac{11}{30}$$

2	10, 18, 15, 30
5	5, 9, 15, 15
3	1, 9, 3, 3
	1, 3, 1, 1

$$\text{LCM} = 2 \times 5 \times 3 \times 3 = 90$$

$$\therefore \frac{7}{10} = \frac{7 \times 9}{10 \times 9} = \frac{63}{90}$$

$$\frac{5}{18} = \frac{5 \times 5}{18 \times 5} = \frac{25}{90}$$

$$\frac{3}{15} = \frac{3 \times 6}{15 \times 6} = \frac{18}{90}$$

$$\frac{11}{30} = \frac{11 \times 3}{30 \times 3} = \frac{33}{90}$$

So, $\frac{63}{90}, \frac{25}{90}, \frac{18}{90}, \frac{33}{90}$ are like fractions.

2. Given in answersheet.

3. Given in answersheet.

4. (a) $\frac{3}{5}$ and $\frac{6}{7}$

LCM of 5 and 7 is 35

$$\therefore \frac{3}{5} = \frac{3 \times 7}{5 \times 7} = \frac{21}{35}$$

and $\frac{6}{7} = \frac{6 \times 5}{7 \times 5} = \frac{30}{35}$

$$\therefore \frac{21}{35} < \frac{30}{35}$$

or $\frac{3}{5} < \frac{6}{7}$

(b) $\frac{6}{7}$ and $\frac{3}{11}$

$$\frac{6}{7} = \frac{6 \times 11}{7 \times 11} = \frac{66}{77}$$

$$\frac{3}{11} = \frac{3 \times 7}{11 \times 7} = \frac{21}{77}$$

$$\therefore \frac{66}{77} > \frac{21}{77}$$

or $\frac{6}{7} > \frac{3}{11}$

(c) $\frac{9}{13}$ and $\frac{1}{17}$

$$\frac{9}{13} = \frac{9 \times 17}{13 \times 17} = \frac{153}{221}$$

$$\frac{1}{17} = \frac{1 \times 13}{17 \times 13} = \frac{13}{221}$$

$$\therefore \frac{153}{221} > \frac{13}{221}$$

or $\frac{9}{13} > \frac{1}{17}$

(d) $\frac{13}{69}$ and $\frac{2}{7}$

$$\frac{13}{69} = \frac{13 \times 7}{69 \times 7} = \frac{91}{453}$$

$$\frac{2}{7} = \frac{2 \times 69}{7 \times 69} = \frac{138}{453}$$

$$\therefore \frac{91}{453} < \frac{138}{453}$$

or $\frac{13}{69} < \frac{2}{7}$

(e) $\frac{8}{15}$ and $\frac{7}{12}$

LCM of 15 and 12 is 60

$$\therefore \frac{8}{15} = \frac{8 \times 4}{15 \times 4} = \frac{32}{60}$$

$$\frac{7}{12} = \frac{7 \times 5}{12 \times 5} = \frac{35}{60}$$

$$\therefore \frac{32}{60} < \frac{35}{60}$$

or $\frac{8}{15} < \frac{7}{12}$

(f) $\frac{5}{18}$ and $\frac{6}{19}$

$$\frac{5}{18} = \frac{5 \times 19}{18 \times 19} = \frac{95}{342}$$

$$\frac{6}{19} = \frac{6 \times 18}{19 \times 18} = \frac{108}{342}$$

$$\therefore \frac{95}{342} < \frac{108}{342}$$

or $\frac{5}{18} < \frac{6}{19}$

(g) $\frac{7}{12}$ and $\frac{6}{17}$

$$\frac{7}{12} = \frac{7 \times 17}{12 \times 17} = \frac{119}{204}$$

$$\frac{6}{17} = \frac{6 \times 12}{17 \times 12} = \frac{72}{204}$$

$$\therefore \frac{119}{204} > \frac{72}{204}$$

or $\frac{7}{12} > \frac{6}{17}$

(h) $\frac{11}{12}$ and $\frac{9}{11}$

$$\frac{11}{12} = \frac{11 \times 11}{12 \times 11} = \frac{121}{132}$$

$$\frac{9}{11} = \frac{9 \times 12}{11 \times 12} = \frac{108}{132}$$

$\therefore \frac{121}{132} > \frac{108}{132}$

or $\frac{11}{12} > \frac{9}{11}$

(i) $\frac{9}{14}$ and $\frac{5}{19}$

$$\frac{9}{14} = \frac{9 \times 19}{14 \times 19} = \frac{171}{266}$$

$$\frac{5}{19} = \frac{5 \times 14}{19 \times 14} = \frac{70}{266}$$

$\therefore \frac{171}{266} > \frac{70}{266}$

or $\frac{9}{14} > \frac{5}{19}$

5. (a) $\frac{7}{9}, \frac{5}{12}, \frac{6}{24}, \frac{3}{15}$

2	9, 12, 24, 15
2	9, 6, 12, 15
3	9, 3, 6, 15
3	3, 1, 2, 5
	1, 1, 2, 5

$$\text{LCM} = 2 \times 2 \times 3 \times 3 \times 2 \times 5 = 360$$

$\therefore \frac{7}{9} = \frac{7 \times 40}{9 \times 40} = \frac{280}{360}$

$$\frac{5}{12} = \frac{5 \times 30}{12 \times 30} = \frac{150}{360}$$

$$\frac{6}{24} = \frac{6 \times 15}{24 \times 15} = \frac{90}{360}$$

$$\frac{3}{15} = \frac{3 \times 24}{15 \times 24} = \frac{72}{360}$$

So, ascending order is $\frac{72}{360}, \frac{90}{360}, \frac{150}{360}, \frac{280}{360}$

or $\frac{3}{15}, \frac{6}{24}, \frac{5}{12}, \frac{7}{9}$

(b) $\frac{3}{4}, \frac{5}{8}, \frac{11}{12}, \frac{17}{24}$

2	4, 8, 12, 24
2	2, 4, 6, 12
2	1, 2, 3, 6
3	1, 1, 3, 3
	1, 1, 1, 1

$$\text{LCM} = 2 \times 2 \times 2 \times 3 = 24$$

$\therefore \frac{3}{4} = \frac{3 \times 6}{4 \times 6} = \frac{18}{24}$

$$\frac{5}{8} = \frac{5 \times 3}{8 \times 3} = \frac{15}{24}$$

$$\frac{11}{12} = \frac{11 \times 2}{12 \times 2} = \frac{22}{24}$$

$$\frac{17}{24} = \frac{17 \times 1}{24 \times 1} = \frac{17}{24}$$

So, ascending order is $\frac{15}{24}, \frac{17}{24}, \frac{18}{24}, \frac{22}{24}$

or $\frac{5}{8}, \frac{17}{24}, \frac{3}{4}, \frac{11}{12}$

(c) $\frac{9}{11}, \frac{3}{22}, \frac{5}{44}, \frac{11}{33}$

2	11, 22, 44, 33
11	11, 11, 22, 33
	1, 1, 2, 3

$$\text{LCM} = 2 \times 11 \times 2 \times 3 = 132$$

$\therefore \frac{9}{11} = \frac{9 \times 12}{11 \times 12} = \frac{108}{132}$

$$\frac{3}{22} = \frac{3 \times 6}{22 \times 6} = \frac{18}{132}$$

$$\frac{5}{44} = \frac{5 \times 3}{44 \times 3} = \frac{15}{132}$$

$$\frac{11}{33} = \frac{11 \times 4}{33 \times 4} = \frac{44}{132}$$

So, ascending order is $\frac{15}{132}, \frac{18}{132}, \frac{44}{132}, \frac{108}{132}$

or $\frac{5}{44}, \frac{3}{22}, \frac{11}{33}, \frac{9}{11}$

(d) $\frac{5}{7}, \frac{9}{14}, \frac{17}{21}, \frac{23}{42}$

7	7, 14, 21, 42
2	1, 2, 3, 6
3	1, 1, 3, 3
	1, 1, 1, 1

$$\text{LCM} = 7 \times 2 \times 3 = 42$$

$$\begin{aligned} \therefore \frac{5}{7} &= \frac{5 \times 6}{7 \times 6} = \frac{35}{42} \\ \frac{9}{14} &= \frac{9 \times 3}{14 \times 3} = \frac{27}{42} \\ \frac{17}{21} &= \frac{17 \times 2}{21 \times 2} = \frac{34}{42} \\ \frac{23}{42} &= \frac{23 \times 1}{42 \times 1} = \frac{23}{42} \end{aligned}$$

So, ascending order is $\frac{23}{42}, \frac{27}{42}, \frac{34}{42}, \frac{35}{42}$

or $\frac{23}{42}, \frac{9}{14}, \frac{17}{21}, \frac{5}{7}$

6. (a) $\frac{3}{4}, \frac{7}{8}, \frac{11}{16}, \frac{23}{40}$

2	4, 8, 16, 40
2	2, 4, 8, 20
2	1, 2, 4, 10
	1, 1, 2, 5

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 5 = 80$$

$$\begin{aligned} \therefore \frac{3}{4} &= \frac{3 \times 20}{4 \times 20} = \frac{60}{80} \\ \frac{7}{8} &= \frac{7 \times 10}{8 \times 10} = \frac{70}{80} \\ \frac{11}{16} &= \frac{11 \times 5}{16 \times 5} = \frac{55}{80} \\ \frac{23}{40} &= \frac{23 \times 2}{40 \times 2} = \frac{46}{80} \end{aligned}$$

So, descending order is $\frac{70}{80}, \frac{60}{80}, \frac{55}{80}, \frac{46}{80}$

or $\frac{7}{8}, \frac{3}{4}, \frac{11}{16}, \frac{23}{40}$

(b) $\frac{8}{15}, \frac{7}{30}, \frac{2}{5}, \frac{1}{6}$

2	15, 30, 5, 6
5	15, 15, 5, 3
3	3, 3, 1, 3
	1, 1, 1, 1

$$\text{LCM} = 2 \times 5 \times 3 = 30$$

$$\begin{aligned} \therefore \frac{8}{15} &= \frac{8 \times 2}{15 \times 2} = \frac{16}{30} \\ \frac{7}{30} &= \frac{7 \times 1}{30 \times 1} = \frac{7}{30} \\ \frac{2}{5} &= \frac{2 \times 6}{5 \times 6} = \frac{12}{30} \end{aligned}$$

$$\frac{1}{6} = \frac{1 \times 5}{6 \times 5} = \frac{5}{30}$$

So, descending order is $\frac{16}{30}, \frac{12}{30}, \frac{7}{30}, \frac{5}{30}$

or $\frac{8}{15}, \frac{2}{5}, \frac{7}{30}, \frac{1}{6}$

(c) $\frac{7}{16}, \frac{4}{24}, \frac{11}{30}, \frac{7}{40}$

2	16, 24, 30, 40
2	12, 12, 15, 20
2	4, 6, 15, 10
5	2, 3, 15, 5
3	2, 3, 3, 1
	2, 1, 1, 1

$$\text{LCM} = 2 \times 2 \times 2 \times 5 \times 3 \times 2 = 240$$

$$\begin{aligned} \therefore \frac{7}{16} &= \frac{7 \times 15}{16 \times 15} = \frac{105}{240} \\ \frac{4}{24} &= \frac{4 \times 10}{24 \times 10} = \frac{40}{240} \\ \frac{11}{30} &= \frac{11 \times 8}{30 \times 8} = \frac{88}{240} \\ \frac{7}{40} &= \frac{7 \times 6}{40 \times 6} = \frac{42}{240} \end{aligned}$$

So descending order is $\frac{105}{240}, \frac{88}{240}, \frac{42}{240}, \frac{40}{240}$

or $\frac{7}{16}, \frac{11}{30}, \frac{7}{40}, \frac{4}{24}$

(d) $\frac{6}{17}, \frac{8}{34}, \frac{1}{4}, \frac{7}{8}$

2	17, 34, 4, 8
2	17, 17, 2, 4
17	17, 17, 1, 2
	1, 1, 1, 2

$$\text{LCM} = 2 \times 2 \times 17 \times 2 = 136$$

$$\begin{aligned} \therefore \frac{6}{17} &= \frac{6 \times 8}{17 \times 8} = \frac{48}{136} \\ \frac{8}{34} &= \frac{8 \times 4}{34 \times 4} = \frac{32}{136} \\ \frac{1}{4} &= \frac{1 \times 34}{4 \times 34} = \frac{34}{136} \\ \frac{7}{8} &= \frac{7 \times 17}{8 \times 17} = \frac{119}{136} \end{aligned}$$

So, descending order is $\frac{119}{136}, \frac{48}{136}, \frac{34}{136}, \frac{32}{136}$

or $\frac{7}{8}, \frac{6}{17}, \frac{1}{4}, \frac{8}{34}$

$$7. \text{ Fraction of book read by Shalini} = \frac{35}{120} = \frac{7}{24}$$

$$\begin{aligned} \text{Fraction of book read by Shivani} &= \frac{25}{100} = \frac{1}{4} \\ &= \frac{1 \times 6}{4 \times 6} = \frac{6}{24} \end{aligned}$$

$$\frac{7}{24} > \frac{6}{24}$$

So, Shalini reads more book than Shivani.

EXERCISE 7.5

$$1. (a) \frac{2}{7} + \frac{5}{9} = \frac{2 \times 9 + 5 \times 7}{63} = \frac{18 + 35}{63} = \frac{53}{63}$$

$$(b) \frac{12}{31} + \frac{16}{31} = \frac{12 + 16}{31} = \frac{28}{31}$$

$$\begin{aligned} (c) \frac{6}{7} + \frac{9}{28} + \frac{4}{1} &= \frac{6 \times 4 + 9 \times 1 + 4 \times 28}{28} \\ &= \frac{24 + 9 + 112}{28} = \frac{145}{28} = 5 \frac{5}{28} \end{aligned}$$

$$\begin{aligned} (d) 1\frac{1}{3} + 3\frac{2}{5} &= \frac{4}{3} + \frac{17}{5} = \frac{4 \times 5 + 17 \times 3}{15} \\ &= \frac{20 + 51}{15} = \frac{71}{15} = 4\frac{11}{15} \end{aligned}$$

$$\begin{aligned} (e) 6\frac{1}{4} + 5\frac{1}{3} + 2 &= \frac{25}{4} + \frac{16}{3} + \frac{2}{1} \\ &= \frac{25 \times 3 + 16 \times 4 + 2 \times 12}{12} \\ &= \frac{75 + 64 + 24}{12} = \frac{163}{12} = 13\frac{7}{12} \end{aligned}$$

$$\begin{aligned} (f) \frac{4}{15} + \frac{3}{10} + 1\frac{2}{3} &= \frac{4}{15} + \frac{3}{10} + \frac{5}{3} \\ &= \frac{4 \times 2 + 3 \times 3 + 5 \times 10}{30} \\ &= \frac{8 + 9 + 50}{30} = \frac{67}{30} = 2\frac{7}{30} \end{aligned}$$

$$\begin{aligned} (g) 2\frac{1}{3} + 1\frac{1}{6} + 12 &= \frac{7}{3} + \frac{7}{6} + \frac{12}{1} \\ &= \frac{7 \times 2 + 7 \times 1 + 12 \times 6}{6} \\ &= \frac{14 + 7 + 72}{6} = \frac{93}{6} = \frac{31}{2} = 15\frac{1}{2} \end{aligned}$$

$$\begin{aligned} (h) 2\frac{1}{7} + 1\frac{1}{14} + 1 &= \frac{15}{7} + \frac{15}{14} + 1 \\ &= \frac{15 \times 2 + 15 \times 1 + 1 \times 14}{14} \\ &= \frac{30 + 15 + 14}{14} = \frac{59}{14} = 4\frac{3}{14} \end{aligned}$$

$$\begin{aligned} (i) 4\frac{1}{5} + 5\frac{1}{6} + 2\frac{1}{3} &= \frac{21}{5} + \frac{31}{6} + \frac{7}{3} \\ &= \frac{21 \times 6 + 31 \times 5 + 7 \times 10}{30} \\ &= \frac{126 + 155 + 70}{30} \end{aligned}$$

$$= \frac{351}{30} = \frac{117}{10} = 11\frac{7}{10}$$

$$\begin{aligned} (j) 6\frac{2}{15} + 1\frac{1}{6} + 3\frac{3}{10} &= \frac{92}{15} + \frac{7}{6} + \frac{33}{10} \\ &= \frac{92 \times 2 + 7 \times 5 + 33 \times 3}{30} \end{aligned}$$

$$= \frac{184 + 35 + 99}{30} = \frac{318}{30}$$

$$= \frac{53}{5} = 10\frac{3}{5}$$

$$\begin{aligned} (k) 2\frac{2}{9} + 1\frac{1}{4} + 3\frac{7}{12} &= \frac{20}{9} + \frac{5}{4} + \frac{43}{12} \\ &= \frac{20 \times 4 + 5 \times 9 + 43 \times 3}{36} \end{aligned}$$

$$= \frac{80 + 45 + 129}{36}$$

$$= \frac{254}{36} = \frac{127}{18} = 7\frac{1}{18}$$

$$\begin{aligned} (l) 3\frac{4}{7} + 1\frac{1}{14} + 2\frac{3}{35} &= \frac{25}{7} + \frac{15}{14} + \frac{73}{35} \\ &= \frac{25 \times 10 + 15 \times 5 + 73 \times 2}{70} \end{aligned}$$

$$= \frac{250 + 75 + 146}{70}$$

$$= \frac{471}{70} = 6\frac{51}{70}$$

$$2. (a) \frac{15}{16} - \frac{7}{10} = \frac{15 \times 5 - 7 \times 8}{80} = \frac{75 - 56}{80} = \frac{19}{80}$$

$$(b) \frac{7}{13} - \frac{5}{26} = \frac{7 \times 2 - 5 \times 1}{26} = \frac{14 - 5}{26} = \frac{9}{26}$$

$$\begin{aligned} (c) \frac{11}{18} - \frac{3}{22} &= \frac{11 \times 11 - 3 \times 9}{198} \\ &= \frac{121 - 27}{198} = \frac{94}{198} = \frac{47}{99} \end{aligned}$$

$$\begin{aligned} (d) 4\frac{5}{18} - 2\frac{3}{24} &= \frac{77}{18} - \frac{51}{24} = \frac{77 \times 4 - 51 \times 3}{72} \\ &= \frac{308 - 153}{72} = \frac{155}{72} = 2\frac{11}{12} \end{aligned}$$

$$(e) 3\frac{3}{15} - 2\frac{1}{15} = \frac{48}{15} - \frac{31}{15} = \frac{48 - 31}{15} = \frac{17}{15} = 1\frac{2}{15}$$

$$(f) 4\frac{1}{16} - 3 = \frac{65}{16} - \frac{3}{1} = \frac{65 \times 1 - 3 \times 16}{16}$$

$$= \frac{65 - 48}{16} = \frac{17}{16} = 1\frac{1}{16}$$

$$(g) 2\frac{7}{9} - 1\frac{8}{15} = \frac{25}{9} - \frac{23}{15} = \frac{25 \times 5 - 23 \times 3}{45}$$

$$= \frac{125 - 69}{45} = \frac{56}{45} = 1\frac{11}{45}$$

$$(h) 3\frac{2}{7} - 1\frac{3}{14} = \frac{23}{7} - \frac{17}{14} = \frac{23 \times 2 - 17}{14}$$

$$= \frac{46 - 17}{14} = \frac{29}{14} = 2\frac{1}{14}$$

$$(i) 2\frac{3}{10} - 1\frac{7}{15} = \frac{23}{10} - \frac{22}{15} = \frac{23 \times 3 - 22 \times 2}{30}$$

$$= \frac{69 - 44}{30} = \frac{25}{30} = \frac{5}{6}$$

$$(j) 4 - 3\frac{1}{12} = \frac{4}{1} - \frac{37}{12} = \frac{4 \times 12 - 37}{12}$$

$$= \frac{48 - 37}{12} = \frac{11}{12}$$

$$(k) 5 - 3\frac{1}{15} = \frac{5}{1} - \frac{46}{15} = \frac{5 \times 15 - 46}{15}$$

$$= \frac{75 - 46}{15} = \frac{29}{15} = 1\frac{14}{15}$$

$$(l) 2\frac{3}{4} - 1\frac{1}{5} = \frac{11}{4} - \frac{6}{5} = \frac{11 \times 5 - 6 \times 4}{20}$$

$$= \frac{55 - 24}{20}$$

$$= \frac{31}{20} = 1\frac{11}{20}$$

$$3. (a) 2\frac{3}{5} + 3\frac{4}{8} - 1\frac{1}{12} = \frac{13}{5} + \frac{28}{8} - \frac{13}{12}$$

$$= \frac{13 \times 24 + 28 \times 15 - 13 \times 10}{120}$$

$$= \frac{312 + 420 - 130}{120}$$

$$= \frac{602}{120} = \frac{301}{60} = 5\frac{1}{60}$$

$$(b) 8\frac{5}{6} - 3\frac{3}{8} + 1\frac{1}{12} = \frac{53}{6} - \frac{27}{8} + \frac{13}{12}$$

$$= \frac{53 \times 4 - 27 \times 3 + 13 \times 2}{24}$$

$$= \frac{212 - 81 + 26}{24}$$

$$= \frac{157}{24} = 6\frac{13}{24}$$

$$(c) \frac{7}{8} + 2\frac{5}{6} - 0 - 2\frac{1}{12} = \frac{7}{8} + \frac{17}{6} - \frac{25}{12}$$

$$= \frac{7 \times 3 + 17 \times 4 - 25 \times 2}{24}$$

$$= \frac{21 + 68 - 50}{24} = \frac{39}{24} = \frac{13}{8} = 1\frac{5}{8}$$

$$(d) 6\frac{1}{6} + 5\frac{1}{6} - 10\frac{1}{8} = \frac{37}{6} + \frac{31}{6} - \frac{81}{8}$$

$$= \frac{37 \times 4 + 31 \times 4 - 81 \times 3}{24}$$

$$= \frac{148 + 124 - 243}{24} = \frac{29}{24} = 1\frac{5}{24}$$

$$(e) 8 - 4\frac{2}{5} + 2\frac{3}{30} + \frac{1}{15} = \frac{8}{1} - \frac{22}{5} + \frac{63}{30} + \frac{1}{15}$$

$$= \frac{8 \times 30 - 22 \times 6 + 63 \times 1 + 1 \times 2}{30}$$

$$= \frac{240 - 132 + 63 + 2}{30}$$

$$= \frac{173}{30} = 5\frac{23}{30}$$

$$(f) 7\frac{2}{5} - 3\frac{2}{12} + 1\frac{7}{10} = \frac{37}{5} - \frac{38}{12} + \frac{17}{10}$$

$$= \frac{37 \times 12 - 38 \times 5 + 17 \times 6}{60}$$

$$= \frac{444 - 190 + 102}{60}$$

$$= \frac{356}{60} = \frac{89}{15} = 5\frac{14}{15}$$

$$(g) 4 + 2\frac{3}{7} - 0 - 1\frac{1}{14} = \frac{4}{1} + \frac{17}{7} - \frac{15}{14}$$

$$= \frac{4 \times 14 + 17 \times 2 - 15 \times 1}{14}$$

$$= \frac{56 + 34 - 15}{14} = \frac{75}{14} = 5\frac{5}{14}$$

$$(h) 12 - 3\frac{1}{2} + 4\frac{1}{5} = 12 - \frac{7}{2} + \frac{21}{5}$$

$$= \frac{12 \times 10 - 7 \times 5 + 21 \times 2}{10}$$

$$= \frac{120 - 35 + 42}{10} = \frac{127}{10} = 12\frac{7}{10}$$

$$4. (a) x - \frac{5}{8} = \frac{1}{4}$$

$$x = \frac{1}{4} + \frac{5}{8}$$

$$x = \frac{1 \times 2 + 5 \times 1}{8}$$

$$x = \frac{2 + 5}{8} = \frac{7}{8}$$

$$(b) x - \frac{1}{5} = \frac{1}{2}$$

$$x = \frac{1}{2} + \frac{1}{5}$$

$$x = \frac{5+2}{10} = \frac{7}{10}$$

$$(c) \frac{2}{15} - x = \frac{1}{10}$$

$$-x = \frac{1}{10} - \frac{2}{15}$$

$$-x = \frac{1 \times 3 - 2 \times 2}{30}$$

$$-x = \frac{3-4}{30}$$

$$-x = -\frac{1}{30}$$

$$\therefore x = \frac{1}{30}$$

$$(d) x - \frac{3}{5} = \frac{1}{3}$$

$$\therefore x = \frac{1}{3} + \frac{3}{5} = \frac{4}{5}$$

$$(e) \frac{1}{2} - x = \frac{1}{5}$$

$$-x = \frac{1}{6} - \frac{1}{2}$$

$$-x = \frac{1-1 \times 3}{6}$$

$$-x = \frac{1-3}{6}$$

$$-x = \frac{-2}{6}$$

$$\therefore x = \frac{1}{3}$$

$$(f) \frac{13}{14} - x = \frac{5}{21}$$

$$-x = \frac{5}{21} - \frac{13}{14}$$

$$-x = \frac{5 \times 2 - 13 \times 3}{42}$$

$$-x = \frac{10-39}{42}$$

$$-x = \frac{-29}{42}$$

$$\therefore x = \frac{29}{42}$$

$$5. (a) \begin{array}{|c|c|c|} \hline \xrightarrow{\quad} + \xrightarrow{\quad} \\ \hline \frac{5}{13} & \frac{4}{13} & \frac{9}{13} \\ \hline \downarrow & & \\ \hline \frac{3}{13} & \frac{6}{13} & \frac{9}{13} \\ \hline \downarrow & & \\ \hline \frac{2}{13} & -\frac{2}{13} & \\ \hline \end{array}$$

$$(b) \begin{array}{|c|c|c|} \hline \xrightarrow{\quad} + \xrightarrow{\quad} \\ \hline \frac{12}{17} & \frac{2}{17} & \frac{14}{17} \\ \hline \downarrow & & \\ \hline \frac{5}{17} & \frac{3}{17} & \frac{8}{17} \\ \hline \downarrow & & \\ \hline \frac{7}{17} & -\frac{1}{17} & \\ \hline \end{array}$$

EXERCISE 7.6

1. Cost of book = ₹ $32\frac{1}{5}$

Cost of note-book = ₹ $10\frac{2}{5}$

Total cost of both = ₹ $\left(32\frac{1}{5} + 10\frac{2}{5}\right) = ₹ 42\frac{3}{5}$

2. Cost of pens = ₹ $13\frac{2}{5}$

Cost of pencil box = ₹ 15

Cost of both = ₹ $\left(13\frac{2}{5} + 15\right) = ₹ \left(\frac{67}{5} + 15\right)$

$$= ₹ \left(\frac{67 \times 1 + 15 \times 5}{5}\right)$$

$$= ₹ \frac{67 + 75}{5} = ₹ \frac{142}{5} = ₹ 28\frac{2}{5}$$

3. Aditi had money = ₹ 200

She gave to her brother = ₹ $115\frac{1}{5}$

Left money = ₹ $\left(200 - 115\frac{1}{5}\right)$

$$= ₹ \left(200 - \frac{576}{5}\right)$$

$$= ₹ \left(\frac{1000 - 576}{5}\right)$$

$$= ₹ \frac{424}{5} = ₹ 84\frac{4}{5}$$

4. Difference = ₹ $\left(38\frac{1}{5} - 20\frac{4}{5}\right)$

$$= ₹ \left(\frac{191}{5} - \frac{104}{5}\right) = ₹ \frac{87}{5} = ₹ 17\frac{2}{5}$$

So, pen is costlier ₹ $17\frac{2}{5}$.

5. Mamta has money = ₹ 500

Cost of fruits = ₹ $250\frac{1}{4}$

Cost of vegetables = ₹ $50\frac{4}{5}$

$$\begin{aligned} \text{Left money} &= ₹ 500 - \left(250\frac{1}{5} + 50\frac{4}{5}\right) \\ &= ₹ \left(\frac{500}{1} - \frac{1251}{5} - \frac{254}{5}\right) \\ &= ₹ \left(\frac{2500 - 1251 - 254}{5}\right) \\ &= ₹ \frac{995}{5} = ₹ 199 \end{aligned}$$

6. Total milk = $3\frac{1}{2} l$

Used milk = $1\frac{1}{5} l$

$$\begin{aligned} \text{Left milk} &= \left(3\frac{1}{2} - 1\frac{1}{5}\right) l \\ &= \left(\frac{7}{2} - \frac{6}{5}\right) l \\ &= \left(\frac{7 \times 5 - 6 \times 2}{10}\right) l = \left(\frac{35 - 12}{10}\right) l \\ &= \frac{23}{10} l = 2\frac{3}{10} l \end{aligned}$$

7. Required number = $5 - 3\frac{4}{9}$

$$\begin{aligned} &= 5 - \frac{31}{9} = \frac{5 \times 9 - 31}{9} \\ &= \frac{45 - 31}{9} = \frac{14}{9} = 1\frac{5}{9} \end{aligned}$$

8. Required number = $10\frac{1}{5} - 7$

$$= \frac{51}{5} - \frac{7}{1} = \frac{51 - 35}{5} = \frac{16}{5} = 3\frac{1}{5}$$

9. $12 - \left(6\frac{2}{5} + 3\frac{1}{4}\right) = 12 - \left(\frac{32}{5} + \frac{13}{4}\right)$

$$\begin{aligned} &= 12 - \left(\frac{32 \times 4 + 13 \times 5}{20}\right) \\ &= 12 - \left(\frac{128 + 65}{20}\right) \\ &= 12 - \frac{193}{20} = \frac{12 \times 20 - 193}{20} \\ &= \frac{240 - 193}{20} = \frac{47}{20} = 2\frac{7}{20} \end{aligned}$$

10. $\left(6\frac{2}{5} + 7\frac{1}{10}\right) - \left(3\frac{1}{9} + 4\frac{1}{6}\right) = \left(\frac{32}{5} + \frac{71}{10}\right) - \left(\frac{28}{9} + \frac{25}{6}\right)$

$$= \left(\frac{32 \times 2 + 71}{10}\right) - \left(\frac{28 \times 2 + 25 \times 3}{18}\right)$$

$$\begin{aligned} &= \left(\frac{64 + 71}{10}\right) - \left(\frac{56 + 75}{18}\right) \\ &= \frac{135}{10} - \frac{131}{18} = \frac{135 \times 9 - 131 \times 5}{90} \\ &= \frac{1215 - 655}{90} = \frac{560}{90} = \frac{56}{9} = 6\frac{2}{9} \end{aligned}$$

➤ HOTS

- Given in answersheet.
- Numerator = Odd single digit = 1
Denominator = four times greater than numerator
 $= 1 \times 4 = 4$

$$\text{Fraction} = \frac{1}{4}$$

- Given in answersheet.
- Given in answersheet.
- Let total students = x

$$\text{Fraction of passed students} = \frac{3}{4}$$

$$\text{Fraction of failed students} = 1 - \frac{3}{4} = \frac{4 - 3}{4}$$

Now, $\frac{1}{4} \times x = 8$

$$x = \frac{8 \times 4}{1} = \frac{32}{1} = 32$$

Number of passed students = $\frac{3}{4} \times 32 = 24$

➤ NCERT CORNER

- 1 day = 24 hours

$$\therefore 8 \text{ hours as a fraction} = \frac{8}{24}$$

2. (a) $\frac{20}{3} \Rightarrow 3\overline{)20} \quad \therefore \frac{20}{3} = 6\frac{2}{3}$

$$\frac{18}{2}$$

(b) $\frac{11}{5} \Rightarrow 5\overline{)11} \quad \therefore \frac{11}{5} = 2\frac{1}{5}$

$$\frac{10}{1}$$

3. (a) $\frac{2}{7} = \frac{8}{\square} \Rightarrow \square \times 2 = 7 \times 8$

$$\Rightarrow \square = \frac{7 \times 8}{2} = \frac{56}{2} \Rightarrow \square = 28$$

$$\therefore \frac{2}{7} = \frac{8}{28}$$

$$(b) \frac{5}{8} = \frac{10}{\square} \Rightarrow \square \times 5 = 8 \times 10$$

$$\Rightarrow \square = \frac{8 \times 10}{5} = \frac{80}{5} \Rightarrow \square = 16$$

$$\therefore \frac{5}{8} = \frac{10}{16}$$

$$4. (a) \frac{48}{60}$$

Factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48.

Factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60.

Common factors are 1, 2, 3, 4, 6 and 12.

\therefore HCF of 48 and 60 is 12

$$\therefore \frac{48}{60} = \frac{48 \div 12}{60 \div 12} = \frac{4}{5}$$

Hence, the simplest form of $\frac{48}{60}$ is $\frac{4}{5}$.

$$(b) \frac{150}{60}$$

Factors of 150 are 1, 2, 3, 5, 6, 10, 15, 25, 30, 50, 75 and 150.

Factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60.

Common factors are 1, 2, 3, 5, 6, 10, 15 and 30.

\therefore HCF of 150 and 60 is 30

$$\therefore \frac{150}{60} = \frac{150 \div 30}{60 \div 30} = \frac{5}{2}$$

Hence, the simplest form of $\frac{150}{60}$ is $\frac{5}{2}$.

5. Naina was given the piece of cake

$$= 1 \frac{1}{2} = \frac{(2 \times 1) + 1}{2} = \frac{2 + 1}{2} = \frac{3}{2}$$

Najma was given the piece of cake

$$= 1 \frac{1}{3} = \frac{(3 \times 1) + 1}{3} = \frac{3 + 1}{3} = \frac{4}{3}$$

Total amount of cake was given to both of them

$$= \frac{3}{2} + \frac{4}{3}$$

\therefore LCM of 2 and 3 = 6

$$\therefore \frac{3}{2} = \frac{3 \times 3}{2 \times 3} = \frac{9}{6} \text{ piece}$$

$$\text{and } \frac{4}{3} = \frac{4 \times 2}{3 \times 2} = \frac{8}{6} \text{ piece}$$

$$\text{Thus, } \frac{9}{6} + \frac{8}{6} = \frac{9+8}{6} = \frac{17}{6} \text{ piece}$$

EXERCISE 8.1

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Do yourself.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.

EXERCISE 8.2

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.

EXERCISE 8.3

$$1. (a) 0.05 = \frac{5}{100} = \frac{1}{20}$$

$$(b) 0.614 = \frac{614}{1000} = \frac{307}{500}$$

$$(c) 0.75 = \frac{75}{100} = \frac{3}{4}$$

$$(d) 0.8 = \frac{8}{10} = \frac{4}{5}$$

$$(e) 0.7 = \frac{7}{10}$$

$$(f) 0.35 = \frac{35}{100} = \frac{7}{20}$$

$$(g) 0.025 = \frac{25}{1000} = \frac{1}{40}$$

$$(h) 0.067 = \frac{67}{1000}$$

$$(i) 0.75 = \frac{75}{100} = \frac{3}{4}$$

$$(j) 0.15 = \frac{15}{100} = \frac{3}{20}$$

$$(k) 0.573 = \frac{573}{1000}$$

$$(l) 0.226 = \frac{226}{1000} = \frac{113}{500}$$

$$2. (a) 9.5 = 9 + .5 = 9 + \frac{5}{10} = 9 + \frac{1}{2} = 9\frac{1}{2}$$

$$(b) 28.75 = 28 + .75 = 28 + \frac{75}{100} = 28 + \frac{3}{4} = 28\frac{3}{4}$$

$$(c) 15.514 = 15 + .514 = 15 + \frac{514}{1000} \\ = 15 + \frac{257}{500} = 15\frac{257}{500}$$

$$(d) 37.68 = 37 + .68 = 37 + \frac{68}{100} = 37 + \frac{17}{25} = 37\frac{17}{25}$$

$$(e) 17.65 = 17 + .65 = 17 + \frac{65}{100} = 17 + \frac{13}{20} = 17\frac{13}{20}$$

$$(f) 2.056 = 2 + .056 = 2 + \frac{56}{1000} = 2 + \frac{7}{125} = 2\frac{7}{125}$$

$$(g) 25.05 = 25 + .05 = 25 + \frac{5}{100} = 25 + \frac{1}{20} = 25\frac{1}{20}$$

$$(h) 6.4 = 6 + .4 = 6 + \frac{4}{10} = 6 + \frac{2}{5} = 6\frac{2}{5} = 6\frac{2}{5}$$

$$(i) 28.36 = 28 + .36 = 28 + \frac{36}{100} = 28 + \frac{9}{25} = 28\frac{9}{25}$$

$$(j) 3.184 = 3 + .184 = 3 + \frac{184}{1000} = 3 + \frac{23}{125} = 3\frac{23}{125}$$

$$(k) 16.25 = 16 + .25 = 16 + \frac{25}{100} = 16 + \frac{1}{4} = 16\frac{1}{4}$$

$$(l) 9.04 = 9 + .04 = 9 + \frac{4}{100} = 9 + \frac{1}{25} = 9\frac{1}{25}$$

3. Given in answersheet.

$$4. (a) \frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{8}{10} = 0.8$$

$$(b) \frac{3}{4} = \frac{3 \times 25}{4 \times 25} = \frac{75}{100} = 0.75$$

$$(c) \frac{19}{4} = \frac{19 \times 25}{4 \times 25} = \frac{475}{100} = 4.75$$

$$(d) \frac{13}{25} = \frac{13 \times 4}{25 \times 4} = \frac{52}{100} = 0.52$$

$$(e) \frac{17}{20} = \frac{17 \times 5}{20 \times 5} = \frac{85}{100} = 0.85$$

$$(f) \frac{28}{125} = \frac{28 \times 8}{125 \times 8} = \frac{224}{1000} = 0.224$$

$$(g) \frac{219}{250} = \frac{219 \times 4}{250 \times 4} = \frac{876}{1000} = 0.876$$

$$(h) 6\frac{7}{250} = 6 + \frac{7}{250} \times \frac{4}{4} = 6 + \frac{28}{1000} = 6.028$$

EXERCISE 8.4

$$1. (a) 1 \text{ paisa} = ₹ \frac{1}{100}$$

$$\therefore 6 \text{ paise} = ₹ \frac{6}{100} = ₹ 0.06$$

$$(b) 21 \text{ paise} = ₹ \frac{21}{100} = ₹ 0.21$$

$$(c) 125 \text{ paise} = ₹ \frac{125}{100} = ₹ 1.25$$

$$(d) 239 \text{ paise} = ₹ \frac{239}{100} = ₹ 2.39$$

$$(e) 525 \text{ paise} = ₹ \frac{525}{100} = ₹ 5.25$$

$$(f) 45 \text{ rupees } 45 \text{ paise} = ₹ \left(45 + \frac{45}{100} \right) = ₹ 45.45$$

$$(g) 15 \text{ rupees } 8 \text{ paise} = ₹ \left(15 + \frac{8}{100} \right) = ₹ 15.08$$

$$(h) 125 \text{ rupees } 18 \text{ paise} = ₹ \left(125 + \frac{18}{100} \right) = ₹ 125.18$$

$$2. (a) 1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$\therefore 8 \text{ cm} = \frac{8}{100} = 0.08 \text{ m}$$

$$(b) 18 \text{ cm} = \frac{18}{100} = 0.18 \text{ m}$$

$$(c) 23 \text{ cm} = \frac{23}{100} = 0.23 \text{ m}$$

$$(d) 37 \text{ cm} = \frac{37}{100} = 0.37 \text{ m}$$

$$(e) 325 \text{ cm} = \frac{325}{100} = 3.25 \text{ m}$$

$$(f) 516 \text{ cm} = \frac{516}{100} = 5.16 \text{ m}$$

$$(g) 8 \text{ m } 8 \text{ cm} = \left(8 + \frac{8}{100} \right) \text{ m} = 8.08 \text{ m}$$

$$(h) 12 \text{ m } 12 \text{ cm} = \left(12 + \frac{12}{100} \right) \text{ m} = 12.12 \text{ m}$$

$$3. (a) 1 \text{ mm} = \frac{1}{10} \text{ cm}$$

$$\therefore 6 \text{ mm} = \frac{6}{10} = 0.6 \text{ cm}$$

$$(b) 15 \text{ mm} = \frac{15}{10} = 1.5 \text{ cm}$$

$$(c) 189 \text{ mm} = \frac{189}{10} = 18.9 \text{ cm}$$

$$(d) 284 \text{ mm} = \frac{284}{10} = 28.4 \text{ cm}$$

$$(e) 9 \text{ cm } 8 \text{ mm} = \left(9 + \frac{8}{10} \right) \text{ cm} = 9.8 \text{ cm}$$

$$(f) 15 \text{ cm } 5 \text{ mm} = \left(15 + \frac{5}{10} \right) \text{ cm} = 15.5 \text{ cm}$$

$$(g) 29 \text{ cm } 3 \text{ mm} = \left(29 + \frac{3}{10}\right) \text{ cm} = 29.3 \text{ cm}$$

$$(h) 489 \text{ mm} = \frac{489}{10} = 48.9 \text{ cm}$$

$$4. (a) 1 \text{ m} = \frac{1}{1000} \text{ km}$$

$$\therefore 9 \text{ m} = \frac{9}{1000} \text{ km} = 0.009 \text{ km}$$

$$(b) 48 \text{ m} = \frac{48}{1000} \text{ km} = 0.048 \text{ km}$$

$$(c) 196 \text{ m} = \frac{196}{1000} = 0.196 \text{ km}$$

$$(d) 5965 \text{ m} = \frac{5965}{1000} \text{ km} = 5.965 \text{ km}$$

$$(e) 4 \text{ km } 4 \text{ m} = \left(4 + \frac{4}{1000}\right) \text{ km} = 4.004 \text{ km}$$

$$(f) 19 \text{ km } 15 \text{ m} = \left(19 + \frac{15}{1000}\right) \text{ km} = 19.015 \text{ km}$$

$$(g) 25 \text{ km } 195 \text{ m} = \left(25 + \frac{195}{1000}\right) \text{ km} = 25.195 \text{ km}$$

$$(h) 140 \text{ km } 34 \text{ m} = \left(140 + \frac{34}{1000}\right) \text{ km} = 140.034 \text{ km}$$

$$5. (a) 1 \text{ gm} = \frac{1}{1000} \text{ kg}$$

$$\therefore 5 \text{ gm} = \frac{5}{1000} \text{ kg} = 0.005 \text{ kg}$$

$$(b) 168 \text{ gm} = \frac{168}{1000} \text{ kg} = 0.168 \text{ kg}$$

$$(c) 3750 \text{ gm} = \frac{3750}{1000} \text{ kg} = 3.750 \text{ kg}$$

$$(d) 7895 \text{ gm} = \frac{7895}{1000} \text{ kg} = 7.895 \text{ kg}$$

$$(e) 6 \text{ kg } 15 \text{ gm} = \left(6 + \frac{15}{1000}\right) \text{ kg} = 6.015 \text{ kg}$$

$$(f) 15 \text{ kg } 9 \text{ gm} = \left(15 + \frac{9}{1000}\right) \text{ kg} = 15.009 \text{ kg}$$

$$(g) 26 \text{ kg } 150 \text{ gm} = \left(26 + \frac{150}{1000}\right) \text{ kg} = 26.150 \text{ kg}$$

$$(h) 150 \text{ kg } 359 \text{ gm} = \left(150 + \frac{359}{1000}\right) \text{ kg} = 150.359 \text{ kg}$$

➔ EXERCISE 8.5

- Given in answersheet.
- Money spent for Hindi book = ₹ 43.76
Money spent for science book = ₹ 56.58

$$\text{So, total money spent} = ₹ (43.76 + 56.58) \\ = ₹ 100.34$$

- Cost of shirt = ₹ 216.95
Cost of shoes = ₹ 382.95
Cost of free flow = ₹ 58.85
So, total cost of all the items
= ₹ (216.95 + 382.95 + 58.85)
= ₹ 658.75
- Money received from mother = ₹ 25.50
Money received from brother = ₹ 15.75
Money received from father = ₹ 40.80
So, Raju received total money
= ₹ (25.50 + 15.75 + 40.80)
= ₹ 82.05
- Mahesh walked in the morning = 3 km 49 m
He walked in the evening = 2 km
So, he walked total distance
= 3 km 49 m + 2 km
= 5 km 49 m
- Amit travelled distance
by bus = 4 km 35 m
by train = 2 km 48 m
by car = 14 km 8 m
So, he travelled total distance
= 4 km 35 m + 2 km 48 m + 14 km 8 m
= 20 km 91 m
- Cloth for kurta-payjama = 4.85 m
Cloth for sister = 2.58 m
Total cloth = (4.85 + 2.58) m = 7.43 m
or = 7 m 43 cm
- Sugar = 4 kg 300 gm
Rice = 2 kg 250 gm
Dal = + 1 kg 150 gm
Total weight = 7 kg 700 gm
- Grapes = 5 kg 50 gm
Apples = 3 kg 80 gm
Mangoes = 2 kg 90 gm
Oranges = 6 kg
Total weight = 16 kg 220 gm
- Weight of an empty cylinder = 15 kg 800 gm
Weight of gas = +14 kg 200 gm
So, total weight = 30 kg 00 gm

➔ EXERCISE 8.6

- Given in answersheet.

2. (a)
$$\begin{array}{r} 36.50 \\ +71.91 \\ \hline 108.41 \end{array}$$

$$\begin{array}{r} 41.367 \\ +28.510 \\ \hline 69.877 \end{array}$$

Now,
$$\begin{array}{r} 108.410 \\ -69.877 \\ \hline 38.533 \end{array}$$

(b)
$$\begin{array}{r} 91.600 \\ +31.796 \\ \hline 123.396 \end{array}$$

$$\begin{array}{r} 2.005 \\ 58.819 \\ +19.000 \\ \hline 79.824 \end{array}$$

Now,
$$\begin{array}{r} 123.396 \\ -79.824 \\ \hline 43.572 \end{array}$$

(c)
$$\begin{array}{r} 117.40 \\ +28.36 \\ \hline 145.76 \end{array}$$

$$\begin{array}{r} 27.964 \\ 39.670 \\ +19.000 \\ \hline 86.634 \end{array}$$

Now,
$$\begin{array}{r} 145.760 \\ -86.634 \\ \hline 59.126 \end{array}$$

(d)
$$\begin{array}{r} 6.1320 \\ +0.0232 \\ \hline 67.1560 \\ \hline 73.3112 \end{array}$$

$$\begin{array}{r} 89.0000 \\ -73.3112 \\ \hline 15.6888 \end{array}$$

(e)
$$\begin{array}{r} 17.684 \\ +7.136 \\ \hline 10.096 \\ \hline 34.916 \end{array}$$

$$\begin{array}{r} 14.678 \\ +9.764 \\ \hline 24.442 \end{array}$$

Now,
$$\begin{array}{r} 34.916 \\ -24.442 \\ \hline 10.474 \end{array}$$

3. Chanchal has money = ₹ 10
Cost of toffees = ₹ 6.60
Left money = ₹ (10 – 6.60) = ₹ 3.40
4. Cost of book = ₹ 158.95
Cost of copies = ₹ 48.64
Total cost = ₹ 207.59
Suresh gave = ₹ 300
So, he got back = ₹ (300 – 207.59) = ₹ 92.41
5. Weight of grapes = 2 kg 450 gm
Weight of oranges = 4 kg 300 gm
Total weight of both fruits
= 2 kg 450 gm + 4 kg 300 gm
= 6 kg 750 gm

Total weight of fruits = 10 kg
So, weight of mangoes = 10 kg – 6 kg 750 gm
= 3 kg 250 gm

6. Total weight of sugar bag = 98 kg 450 gm
Weight of empty bag = 3 kg 294 gm
So, weight of sugar = (98.450 – 3.294) kg
= 95.156 kg
7. Manu bought grapes = 2.350 kg
She gave to her friend = 0.998 kg
Left grapes = (2.350 – 0.998) kg = 1.352 kg
8. Total distance = 12.350 km
Covered by rickshaw = 3.158 km
Covered by bus = (12.350 – 3.158) km = 9.192 km
9. Total cloth = 30.15 m
Cloth for curtain = 18.98 m
So, remaining cloth = (30.15 – 18.98) m
= 11.17 m
10. Length of pencil = 10.8 cm
Length of used pencil = 4.3 cm
So, length of remaining pencil = (10.8 – 4.3) cm
= 6.5 cm

⇒ **HOTS**

1. Given in answersheet.
2. Given in answersheet.
3. The largest four digit decimal number less than 1 using the digits 1, 5, 3 and 8 once is 0.8531.
4. Tanuj walked on Monday = 8.62 km
Tanuj walked on Tuesday = 7.05 km
Distance he walked on both Monday and Tuesday
= 8.62 km + 7.05 km
= 15.67 km
Total distance he walked on Monday, Tuesday and Wednesday = 21.01 km
Tanuj walked distance on Wednesday =
21.01 km
$$\begin{array}{r} 21.01 \\ -15.67 \\ \hline 5.34 \end{array}$$

So, Tanuj walked 5.34 km on Wednesday.
5. Difference between 81.242 and 28.353
$$\begin{array}{r} 81.242 \\ -28.353 \\ \hline 52.889 \end{array}$$

Sum of 625.428 and 39.999

$$\begin{array}{r} 625.428 \\ +39.999 \\ \hline 665.427 \end{array}$$

Sum of the difference between 81.242 and 28.353 and the sum of 625.428 and 39.999

$$= 52.889 + 665.427 = 718.316$$

⇒ NCERT CORNER

- (a) $0.6 = \frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}$
(b) $2.5 = \frac{25}{10} = \frac{25 \div 5}{10 \div 5} = \frac{5}{2}$
(c) $1.0 = \frac{10}{10} = 1$
(d) $3.8 = \frac{38}{10} = \frac{38 \div 2}{10 \div 2} = \frac{19}{5}$
(e) $13.7 = \frac{137}{10}$
(f) $21.2 = \frac{212}{10} = \frac{212 \div 2}{10 \div 2} = \frac{106}{5}$

2. Given in answersheet.

3. (a) 0.3 or 0.4

Whole Part for both is 0, *i.e.*, same.

∴ $0.3 < 0.4$. In tenth part $3 < 4$

(b) 0.07 or 0.02

Whole Part for both is 0, *i.e.*, same.

Tenth part for both is 0, *i.e.*, same.

∴ $0.07 > 0.02$. In hundredth part $7 > 2$

(c) 3 or 0.8

In Whole Part $3 > 0$

∴ $3 > 0.8$

(d) 0.5 or 0.05

Whole Part for both is 0, *i.e.*, same.

∴ $0.5 > 0.05$. In tenth Part $5 > 0$

(e) 1.23 or 1.2

Whole Part for both is 1, *i.e.*, same.

Tenth part for both is 2, *i.e.*, same

In hundredths part $1.2 = 1.20$

∴ $3 > 0$ ∴ $1.23 > 1.2$

(f) 0.099 or 0.19

Whole Part for both is 0, *i.e.*, same.

In tenth part $0 < 1$

∴ $0.099 < 0.19$

Whole part for both is 1, *i.e.*, same.

Tenth part for both is 5, *i.e.*, same.

In hundredths part $1.5 = 1.50$

4. We know that, $1 \text{ cm} = \frac{1}{100} \text{ m}$

(a) $15 \text{ cm} = \frac{15}{100} \text{ m}$

$$= 0.15 \text{ m}$$

(b) $6 \text{ cm} = \frac{6}{100} \text{ m}$

$$= 0.06 \text{ m}$$

(c) $2 \text{ m } 45 \text{ cm} = 2 \text{ m} + \frac{45}{100} \text{ m}$

$$= 2.45 \text{ m}$$

(d) $9 \text{ m } 7 \text{ cm} = 9 \text{ m} + \frac{7}{100} \text{ m} = 9.07 \text{ m}$

(e) $419 \text{ cm} = \frac{419}{100} \text{ m} = 4.19 \text{ m}$

5. Naresh walked in the morning = 2 km 35 m

He walked in the evening = 1 km 7 m

Naresh walk in all = 2 km 35 m + 1 km 7 m

$$= 3.042 \text{ km}$$

9 Data Handling

⇒ EXERCISE 9.1

1. (a) Data obtained in the original form is called raw data.

(b) Arranging the numerical figures in an ascending or a descending order is called an array.

(c) Arranging the data in a systematic form in the form of a table is called tabulation or presentation of the data.

(d) The number of times a particular observation occurs is called its frequency.

(e) It is the science which deals with the collection, presentation, analysis and interpretation of numerical data.

2. Do it yourself.

3. Do it yourself.

4. Do it yourself.

5. Do it yourself.

6. Do it yourself.

7. Do it yourself.

8. Do it yourself.

⇒ NCERT CORNER

1. Given in answersheet.

2. Given in answersheet.

10

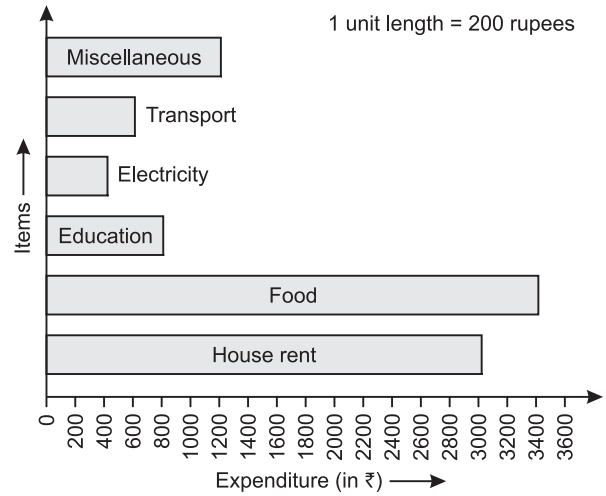
Pictograph

EXERCISE 10.1

1. Do it yourself.
2. Do it yourself.
3. Do it yourself.
4. Do it yourself.
5. Do it yourself.
6. Given in answersheet
7. Given in answersheet
8. Given in answersheet

NCERT CORNER

1. Given in answersheet.
2. Given in answersheet.



11

Bar Graph

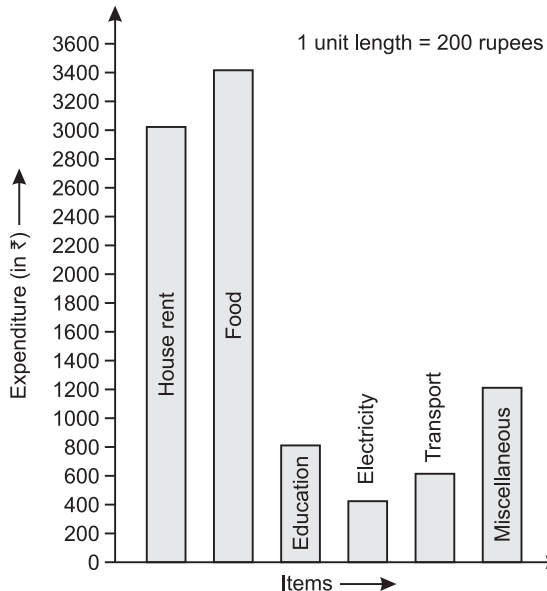
EXERCISE 11.1

1. Do it yourself.
2. Do it yourself.
3. Do it yourself.
4. Do it yourself.
5. Given in answersheet
6. Given in answersheet
7. Given in answersheet

HOTS

1. Calculate the heights of the bars for various items as shown below :

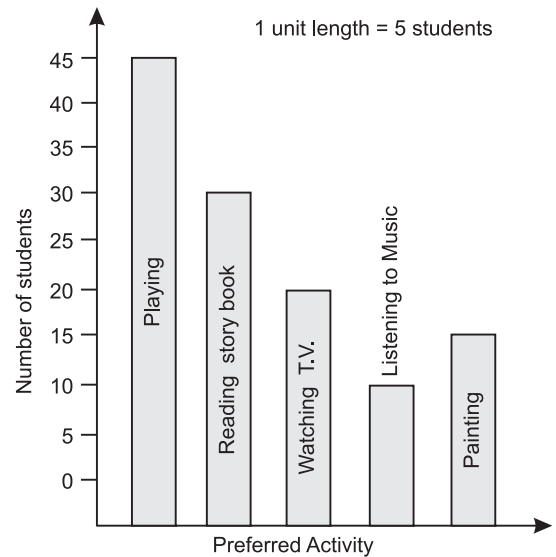
House rent	: ₹ 3000	÷ 200	= 15 units
Food	: ₹ 3400	÷ 200	= 17 units
Education	: ₹ 800	÷ 200	= 4 units
Electricity	: ₹ 400	÷ 200	= 2 units
Transport	: ₹ 600	÷ 200	= 3 units
Miscellaneous	: ₹ 1200	÷ 200	= 6 units



Same data can be represented by interchanging positions of items and expenditure as shown ahead :

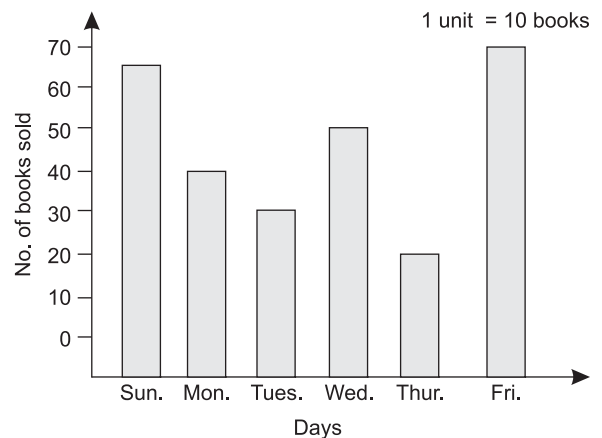
NCERT CORNER

1. Bar graph of the given data



The activity "Reading story books" is preferred by most of the students other than playing.

2. Bar graph to represent the above information is as follows :



EXERCISE 12.1

1. (a) Perimeter = $4 + 5 + 7 = 16$ cm
 (b) Perimeter = $4 + 7 + 8 + 5.5 = 24.5$ cm
 (c) Perimeter = $4 + 8 + 10 + 5 = 27$ cm
 (d) Perimeter = $3 + 2 + 1 + 2 + 1 + 3 + 7 + 3 + 1 + 2 + 1 + 2 = 28$ cm
 (e) Perimeter = $4 + 2 + 3.5 + 3.5 + 3 + 5 = 21$ cm
 (f) Perimeter = $4 + 7 + 6 + 8 = 25$ cm
2. (a) Perimeter of rectangle = $2(l + b) = 2(10 + 8) = 2 \times 18 = 36$ cm
 (b) Perimeter = $2(l + b) = 2(1.2 + 1) = 2 \times 2.2 = 4.4$ m
 (c) Perimeter = $2(l + b) = 2(1 + .8) = 2 \times 1.8 = 3.6$ m
 (d) Perimeter = $2(l + b) = 2(6 + 4.8) = 2 \times 10.8 = 21.6$ m
3. (a) Perimeter of a square = $4 \times \text{length of one side} = 4 \times 18 \text{ cm} = 72$ cm
 (b) Perimeter of a square = $4 \times \text{length of one side} = 4 \times 22.50 = 90$ m
 (c) Perimeter of a square = $4 \times \text{length of one side} = 4 \times 25 \text{ m} = 100$ m
 (c) Perimeter of a square = $4 \times \text{length of one side} = 4 \times 36 \text{ dm} = 144$ dm
4. (a) Perimeter of rectangle = 180
 $\Rightarrow 2(l + b) = 180$
 $\Rightarrow 2(l + 40) = 180$
 $\Rightarrow 2l + 80 = 180$
 $\Rightarrow 2l = 180 - 80$

$$2l = 100$$

$$\therefore l = \frac{100}{2}$$

$$l = 50 \text{ cm}$$

- (b) Perimeter of rectangle = 330
 $\Rightarrow 2(l + b) = 330$
 $\Rightarrow 2(l + 45) = 330$
 $\Rightarrow 2l + 90 = 330$
 $\Rightarrow 2l = 330 - 90$
 $2l = 240$
 $\therefore l = \frac{240}{2} = 120$ cm

5. (a) Perimeter of rectangle = 250
 $\Rightarrow 2(l + b) = 250$
 $\Rightarrow 2(85 + b) = 250$
 $\Rightarrow 170 + 2b = 250$
 $\Rightarrow 2b = 250 - 170$
 $2b = 80$
 $\therefore b = \frac{80}{2} = 40$ cm
- (b) Perimeter of rectangle = 480
 $\Rightarrow 2(l + b) = 480$
 $\Rightarrow 2(124 + b) = 480$
 $\Rightarrow 248 + 2b = 480$
 $\Rightarrow 2b = 480 - 248$
 $2b = 232$
 $b = 116$ cm

6. Length of table-top = 1.75 m
 Breadth of table-top = 1.25 m
 Perimeter of table-top = $2(l + b) = 2(1.75 + 1.25) = 2 \times 3 = 6$ m
7. Perimeter of equilateral triangle = $3 \times \text{side} = 3 \times 5.6 = 16.8$ cm

8. Perimeter of square = 56 cm
 $4 \times \text{side} = 56$
 $\therefore \text{Side} = \frac{56}{4} = 14$ cm

9. Perimeter of hexagon = $6 \times \text{side}$
 $= 6 \times 6 = 36 \text{ cm}$
10. Perimeter of pentagon = 35
 $5 \times \text{side} = 35$
 $\therefore \text{Side} = \frac{35}{5} = 7 \text{ cm}$
11. Perimeter of park = $2(l + b)$
 $= 2(80 + 68)$
 $= 2 \times 148 = 296 \text{ m}$
 Cost of fencing = 296×8.80
 $= ₹ 2604.80$
12. Perimeter of square park = $4 \times \text{side}$
 $= 4 \times 320 = 1280 \text{ m}$
 Cost of fencing = 1280×12
 $= ₹ 15360$
13. Perimeter of rectangular garden = $2(l + b)$
 $= 2(120 + 90)$
 $= 2 \times 210 = 420 \text{ m}$
 So, distance covered in 10 rounds
 $= 420 \times 10 = 4200 \text{ m}$
14. Perimeter of field = $2(l + b)$
 $= 2(90 + 78)$
 $= 2 \times 168 = 336 \text{ m}$
 Length of wire = $6 \times 336 = 2016 \text{ m}$
 Cost of wire = 2016×11.80
 $= ₹ 23788.80$
15. Harpreet covers = $2(l + b)$
 $= 2(70 + 58)$
 $= 2 \times 128 = 256 \text{ m}$
 Karan covers = $4 \times 80 = 320 \text{ m}$
 So, Karan covers more distance by Harpreet
 $= 320 \text{ m} - 256 \text{ m}$
 $= 64 \text{ m}$
16. Ratio of length and breadth = 3 : 2
 So, length is $(3x) \text{ m}$ and breadth is $(2x) \text{ m}$
 Perimeter = 60
 $2(l + b) = 60$
 $2(3x + 2x) = 60$
 $2 \times 5x = 60$
 $10x = 60$
 $x = \frac{60}{10}$
 $x = 6$
 So, length is $3 \times 6 = 18 \text{ m}$
 and breadth is $2 \times 6 = 12 \text{ m}$

17. Perimeter of the field = $\frac{1560}{6.50} = 240 \text{ m}$
 $2(l + b) = 240$
 $l(l + 50) = 240$
 $2l + 100 = 240$
 $2l = 240 - 100$
 $2l = 140$
 $\therefore l = \frac{140}{2}$
 $l = 70 \text{ m}$
18. Perimeter of square park = $\frac{1872}{12} \text{ m} = 156 \text{ m}$
 $4 \times \text{side} = 156$
 $\text{side} = \frac{156}{4}$
 $\text{side} = 39 \text{ m}$
19. Perimeter of triangle = 40
 $12 + 15 + x = 40$
 $x = 40 - 27$
 $x = 13 \text{ cm}$

⇒ EXERCISE 12.2

1. Do yourself.

⇒ EXERCISE 12.3

1. (a) Area of rectangle = $l \times b = 10 \times 8 = 80 \text{ m}^2$
 (b) Area of rectangle = $l \times b = 10.4 \times 9.6$
 $= 99.84 \text{ m}^2$
 (c) Area of rectangle = $l \times b$
 $= 15 \times 1.85 = 27.75 \text{ m}^2$
 (d) Area of rectangle = $l \times b$
 $= 1.5 \times .85 = 1.275 \text{ m}^2$
2. (a) Area of square = side^2
 $= (12)^2 = 144 \text{ m}^2$
 (b) Area of square = $(14)^2 = 196 \text{ m}^2$
 (c) Area of square = $(18.5)^2 = 342.25 \text{ m}^2$
 (d) Area of square = $(20)^2 = 400 \text{ dm}^2$
3. Length of garden = $\frac{\text{Area}}{\text{Breadth}}$
 $= \frac{7800}{78} = 100 \text{ m}$
4. Area of ground = $l \times b$
 $= (110 \times 85) \text{ m}^2 = 9350 \text{ m}^2$
 Cost of levelling = ₹ (9350×1.75)
 $= ₹ 16362.50$

5. Area of floor = $l \times b$
 $= 14 \times 12 = 168 \text{ m}^2$
 Cost of carpeting = ₹ (168×25)
 $= ₹ 4200$
6. Area of floor = $6 \times 4 = 24 \text{ m}^2$
 Area of carpet = $3^2 = 9 \text{ m}^2$
 So, remaining area of floor = $24 - 9 = 15 \text{ m}^2$

7. Area of rectangular field = $\frac{9450}{6.75}$
 $l \times b = 1400 = 1400$
 $40 \times b = 1400$
 $b = 1400 \div 40$
 $b = 35 \text{ m}$

8. Area of room = $(18.5 \times 16) \text{ m}^2$
 $= 296 \text{ m}^2$
 Area of one tile = $(25)^2 \text{ cm}^2$
 $= 625 \text{ cm}^2$
 $= \frac{625}{10000} \text{ m}^2$

- So number of required tiles = $\frac{296}{\frac{625}{10000}}$
 $= \frac{296 \times 10000}{625}$
 $= 4736 \text{ tiles}$
 Cost of tiles = ₹ (4736×24)
 $= ₹ 1,13,664$

9. Area of floor = $(968 \times 620) \text{ cm}^2$
 $= 600160 \text{ cm}^2$
 Area of one tile = $20 \times 11 = 220 \text{ cm}^2$
 So, number of required tiles = $\frac{600160}{220}$
 $= 2728 \text{ tiles}$
 Cost of tiles = ₹ (2728×18)
 $= ₹ 49104$

10. Area of rectangular field = $l \times b$
 $= 90 \times 60$
 $= 5400 \text{ m}^2$
 Perimeter of square filled
 $= \text{Perimeter of rectangular field}$
 $4 \times \text{side} = 2(l + b)$
 $4 \times \text{side} = 2(90 + 60)$
 $4 \times \text{side} = 2 \times 150$
 $4 \times \text{side} = 300$

- $\therefore \text{side} = \frac{300}{4}$
 $\text{side} = 75 \text{ m}$
 So, area of square field = $(75)^2 \text{ m}^2$
 $= 5625 \text{ m}^2$

So, area of square field is more by 225 m^2 .

11. Area of cloth = $(2.25 \times 4) \text{ m}^2 = 9 \text{ m}^2$
 Cost of cloth = ₹ $(9 \times 25) = ₹ 225$
12. (a) Area of given figure = $(6 \times 2) + (6 \times 2) + 5 \times 2$
 $= 12 + 12 + 10 = 34 \text{ cm}^2$
 (b) Area of given figure = $(5 \times 1 + 6 \times 1)$
 $= 11 \text{ cm}^2$
 (c) Area of given figure = $(7 \times 2 + 4 \times 2)$
 $= 14 + 8 = 22 \text{ cm}^2$
 (d) Area of given figure
 $= (10 \times 2 + 6 \times 2 + 2 \times 2) \text{ cm}^2$
 $= (20 + 12 + 4) \text{ cm}^2$
 $= 36 \text{ cm}^2$

⇒ HOTS

1. Perimeter of rectangle = 22 sq. cm
 Area of rectangle = 28 cm
 $2(l + b) = 22$
 $l + b = \frac{22}{2} = 11 \quad \dots(1)$
 $l \times b = 28 \quad \dots(2)$
 Putting eq. (1) in eq. (2)
 $l \times b = 28$
 $l \times (11 - l) = 28$
 $11l - l^2 = 28$
 $11l - l^2 - 28 = 0$
 $l^2 - 11l + 28 = 0$
 $l^2 - 7l - 4l + 28 = 0$
 $l(l - 7) - 4(l - 7) = 0$
 $(l - 4)(l - 7) = 0$

$l = 4 \text{ cm}, l = 7 \text{ cm}$
 $\therefore \text{Dimensions} = 7 \text{ cm}, 4 \text{ cm}$

2. Let breadth of rectangle = $x \text{ cm}$
 Length = $3 \times x + 5$
 Perimeter = 42 cm
 Perimeter = $2(l + b)$
 $42 = 2(3x + 5 + x)$
 $\frac{42}{2} = 4x + 5$
 $4x + 5 = 21$

$$4x = 21 - 5 = 16$$

$$x = \frac{16}{4} = 4 \text{ cm}$$

$$\text{Breadth} = 4 \text{ cm}$$

$$\text{Length} = 3x + 5 = (4 \times 3 + 5) = 12 + 5 = 17 \text{ cm}$$

3. Perimeter of star = 36 cm

$$\text{Number of identical equilateral triangles} = 12$$

$$\text{Perimeter of identical equilateral triangle} = \frac{36}{12} = 3 \text{ cm}$$

$$\text{Perimeter of shaded hexagon} = 3 \times 6 = 18 \text{ cm}$$

4. Perimeter of rectangle = 39 cm

$$\text{Let Length of rectangle} = x \text{ cm}$$

$$\text{Breadth of rectangle} = \frac{x}{2} \text{ cm}$$

$$\text{Perimeter of rectangle} = 2(l + b)$$

$$2\left(x + \frac{x}{2}\right) = 39$$

$$x + \frac{x}{2} = \frac{39}{2}$$

$$\frac{3x}{2} = \frac{39}{2}$$

$$3x = \frac{39 \times 2}{2} = 39$$

$$x = \frac{39}{3} = 13 \text{ cm}$$

$$\begin{aligned} \text{Area of original square} &= (\text{side})^2 = (13)^2 \\ &= 13 \times 13 = 169 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Perimeter of original square} &= 4 \times \text{side} = 4 \times 13 \\ &= 52 \text{ cm} \end{aligned}$$

⇒ NCERT CORNER

1. Length of wooden strip required

$$= \text{Perimeter of the frame}$$

$$= 2 \times (\text{Length} + \text{Breadth})$$

$$= 2 \times (32 \text{ cm} + 21 \text{ cm})$$

$$= 2 \times 53 \text{ cm}$$

$$= 106 \text{ cm}$$

2. Perimeter of a triangle = Sum of its all three side

$$\therefore 36 \text{ cm} = 12 \text{ cm} + 14 \text{ cm} + \text{third side}$$

$$\text{Third side} = 36 \text{ cm} - (12 \text{ cm} + 14 \text{ cm})$$

$$= 36 \text{ cm} - 26 \text{ cm} = 10 \text{ cm}$$

3. (a) Fully-filled squares = 8

$$\therefore \text{Area} = 8 \text{ sq units}$$

(b) Fully-filled squares = 2

$$\text{Half-filled squares} = 4$$

$$\begin{aligned} \text{Area covered by full squares} &= 2 \times 1 \text{ sq unit} \\ &= 2 \text{ sq units} \end{aligned}$$

$$\begin{aligned} \text{Area covered by half squares} &= 4 \times \frac{1}{2} \text{ sq unit} \\ &= 2 \text{ sq units} \end{aligned}$$

$$\therefore \text{Total area} = 2 \text{ sq units} + 2 \text{ sq units} = 4 \text{ sq units}$$

(c) Fully-filled squares = 10

$$\therefore \text{Area} = 10 \text{ sq units}$$

(d) Fully-filled squares = 4

$$\text{Half-filled squares} = 4$$

$$\begin{aligned} \text{Area covered by full squares} &= 4 \times 1 \text{ sq unit} \\ &= 4 \text{ sq units} \end{aligned}$$

$$\begin{aligned} \text{Area covered by half squares} &= 4 \times \frac{1}{2} \text{ sq. units} \\ &= 2 \text{ sq units} \end{aligned}$$

$$\therefore \text{Total area} = 4 \text{ sq units} + 2 \text{ sq units} = 6 \text{ sq units}$$

(e) Fully-filled squares = 5

$$\therefore \text{Area} = 5 \text{ sq units}$$

(f) Fully-filled squares = 4

$$\text{Half-filled squares} = 2$$

$$\begin{aligned} \text{Area covered by full squares} &= 4 \times 1 \text{ sq unit} \\ &= 4 \text{ sq units} \end{aligned}$$

$$\begin{aligned} \text{Area covered by half squares} &= 2 \times \frac{1}{2} \text{ sq units} \\ &= 1 \text{ sq units} \end{aligned}$$

$$\therefore \text{Total area} = 4 \text{ sq units} + 1 \text{ sq unit} = 5 \text{ sq units}$$

4. Length of the piece of land = 5 m

$$\text{Breadth of the piece of land} = 4 \text{ m}$$

$$\begin{aligned} \therefore \text{Area of the piece of land} &= \text{Length} \times \text{Breadth} \\ &= 5 \text{ m} \times 4 \text{ m} = 20 \text{ sq m} \end{aligned}$$

$$\text{Side of the square flower bed} = 1 \text{ m}$$

$$\begin{aligned} \therefore \text{Area of the square flower bed} &= \text{Side} \times \text{Side} \\ &= 1 \text{ m} \times 1 \text{ m} \\ &= 1 \text{ sq m} \end{aligned}$$

$$\begin{aligned} \text{Area of 5 square flower bed} &= 5 \times 1 \text{ sq m} \\ &= 5 \text{ sq m} \end{aligned}$$

$$\begin{aligned} \text{Area of the remaining part of the land} \\ &= 20 \text{ sq m} - 5 \text{ sq m} = 15 \text{ sq m} \end{aligned}$$

5. Length of the rectangular plot = 500 m

$$\text{Breadth of the rectangular plot} = 200 \text{ m}$$

$$\begin{aligned} \therefore \text{Area of the rectangular plot} &= 500 \text{ m} \times 200 \text{ m} \\ &= 100000 \text{ sq m} \end{aligned}$$

$$\therefore \text{Cost of filing 100 sq m} = ₹ 8$$

$$\therefore \text{Cost of filing 1 sq m} = ₹ \frac{8}{100}$$

$$\begin{aligned} \therefore \text{Cost of filing } 100000 \text{ sq m} &= ₹ \frac{8}{100} \times 100000 \\ &= ₹ 8,000 \end{aligned}$$

13

Algebraic Expression

EXERCISE 13.1

- Given in answersheet.
- Given in answersheet.
- (a) $x^3 y^6 = x \times x \times x \times y \times y \times y \times y \times y \times y$
 (b) $a^4 b^9 = a \times a \times a \times a \times b \times b \times b \times b \times b \times b \times b \times b \times b$
 (c) $5^8 3^4 x^4 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 3 \times 3 \times 3 \times 3 \times x \times x \times x \times x$
 (d) $11^3 x^5 y^2 z^2 = 11 \times 11 \times 11 \times x \times x \times x \times x \times x \times y \times y \times z \times z$
 (e) $9x^2 y^3 c^3 = 9 \times x \times x \times y \times y \times y \times c \times c \times c$
 (f) $5^3 x^3 y^3 z^6 = 5 \times 5 \times 5 \times x \times x \times x \times y \times y \times y \times z \times z \times z \times z \times z \times z$
- Number of mangoes in one box = 60
 So, number of mangoes in 'b' boxes = $60b$.
- One student got 6 toffees
 So 's' students got '6s' toffees.
- A bird flies distance in one minute = 2 km
 So, it will cover distance in t time = $2t$ km
- Let age of Meera be m years
 So, age of Rama will be $(m - 5)$ years

EXERCISE 13.2

- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- Given in answersheet.
- (a) $4xy + 5y^2 z - 9 = 4 \times 1 \times 2 + 5 \times 2^2 \times (-3) - 9$
 $= 8 - 60 - 9 = -61$
 (b) $37x - 4y^2 z + 4 = 37 \times 1 - 4 \times 2^2 \times (-3) + 4$
 $= 37 + 48 + 4 = 89$
 (c) $13x^2 y + 5z - 4y^2$
 $= 13 \times 1^2 \times 2 + 5 \times (-3) - 4 \times 2^2$
 $= 26 - 15 - 16$
 $= -5$

$$\begin{aligned} \text{(d)} \quad 14y + 13z - 6x^3 &= 14 \times 2 + 13 \times (-3) - 6 \times 1^3 \\ &= 28 - 39 - 6 = -17 \end{aligned}$$

- (a) $a = 1, b = 2a, = 2 \times 1 = 2$
 $c = -2, t = -1$
 $4ab^2 t + sc = 4 \times 1 \times 2^2 \times -1 + s \times -2$
 $= -16 - 10 = -26$
 (b) $4b^3 (-sa^3 + 17) = 4 \times 2^3 \times (-2) - 5 \times 1^3 + 17$
 $= -64 - 5 + 17 = -52$
 (c) $-19c^2 b + 3abc$
 $= -19 \times (-2)^2 \times 2 + 3 \times 1 \times 2 \times -2$
 $= -152 - 12 = -164$
 (d) $17t^2 + 4t - 9a + 4c^2$
 $= 17 \times (-1)^2 + 4 \times -1 - 9 \times 1 + 4 \times (-2)^2$
 $= 17 - 4 - 9 + 16 = 20$

EXERCISE 13.3

- (a) $14yx - 3xy = (14 - 3)xy = 11xy$
 (b) $7xyz - 3xyz + 5xyz = (7 - 3 + 5)xyz = 9xyz$
 (c) $51x^2 y - 14yx^2 + 3x^2 y = (15 - 14 + 3)x^2 y = 4x^2 y$
 (d) $-3x^2 + xy + 4x^2 - 6xy$
 $= (-3 + 4)x^2 + (1 - 6)xy$
 $= x^2 - 5xy$
 (e) $3xy + 7y^2 + 9xy^2 + 7xy^2 - 6y^2 + 4xy$
 $= (3 + 4)xy + (7 - 6)y^2 + (9 + 7)xy^2$
 $= 7xy + y^2 + 16xy^2$
 (f) $9abc + 3b^2 c + 5abc - 5b^2 c$
 $= (a + 5)abc + (3 - 5)b^2 c$
 $= 14abc - 2b^2 c$
 (g) $3x^3 + 5xy - 6 + 6xy + 8 - 8x^3$
 $= (3 - 8)x^3 + (5 + 6)xy - 6 + 8$
 $= -5x^3 + 11xy + 2$
 (h) $3c^2 b - 4a^2 c + 7ab + 4bc^2 - 4ab$
 $= (3 + 4)c^2 b - 4a^2 c + (7 - 4)ab$
 $= 7c^2 b - 4a^2 c + 3ab$
 (i) $4xy^2 + 6xy - 4 + 7xy^2 - 8xy$
 $= (4 + 7)xy^2 + (6 - 8)xy - 4$
 $= 11xy^2 - 2xy - 4$
 (j) $a + b + cd - 7 + b + a - 3cd + 5$
 $= 2a + 2b + (1 - 3)cd - 2$
 $= 2a + 2b - 2cd - 2$

$$2. (a) \quad \begin{array}{r} 8x^4 + 5x^3 - 9x^2 + 7 \\ + 5x^4 - 6x^3 + 8x^2 + 4 \\ \hline 13x^4 - x^3 - x^2 + 11 \end{array}$$

$$(b) \quad \begin{array}{r} 3b^2 + 6ab - 9a^2 + 4 \\ + \quad \quad + 3ab - 8a^2 + 7 \\ \hline 3b^2 + 9ab - 17a^2 + 11 \end{array}$$

$$(c) \quad \begin{array}{r} x^3 + y^3 + z^3 - 3xyz \\ 3x^3 + y^3 - 4z^3 + 6xyz \\ 3x^3 + 4y^3 + z^3 + 5xyz \\ \hline 7x^3 + 6y^3 - 2z^3 + 8xyz \end{array}$$

$$(d) \quad \begin{array}{r} 4xy - 5y^2z + 7 \\ + 9xy - 9y^2z + 8 \\ - 4xy + 5zy^2 \\ \hline 9xy - 9zy^2 + 15 \end{array}$$

$$(e) \quad \begin{array}{r} -7x^2 + 2y^2 - 5xy + 8 \\ + 9x^2 - 3y^2 + 4xy + 7 \\ 4x^2 \quad \quad + 8xy - 6 \\ \hline 6x^2 - y^2 + 7xy + 9 \end{array}$$

$$(f) \quad \begin{array}{r} y^2 + z^2 + 8xy \\ - 9y^2 + 3z^2 - 4xy \\ + 8y^2 + 5z^2 + 3xy \\ \hline 0 + 9z^2 + 7xy \end{array}$$

$$3. (a) -5x - 14x = (-5 - 14)x = -19x$$

$$(b) 7xy^2 - (-9xy^2) = 7xy^2 + 9xy^2 \\ = (7 + 9)xy = 16xy^2$$

$$(c) -15yx - 5xy = (-15 - 5)xy = -20xy$$

$$(d) -4zy^3 - 10y^3z = (-4 - 10)zy^3 = -14zy^3$$

$$(e) -yx^2z - 13x^2yz = (-1 - 13)yx^2z \\ = -14yx^2z$$

$$(f) -9x^2z - (-4x^2z) = -9x^2z + 4x^2z \\ = -5x^2z$$

$$(g) -4xy^2t - 17xy^2t = (-4 - 17)xy^2t \\ = -21xy^2t$$

$$(h) -13p^2m - 5p^2m = (-13 - 5)p^2m = -18p^2m$$

$$(i) -4a^2b^2 - a^2b^2 = (-4 - 1)a^2b^2 = -5a^2b^2$$

$$(j) -5mtl - 14mtl = (-4 - 14)mtl \\ = -19mtl$$

$$4. (a) \quad \begin{array}{r} 4b - 3c + 5a \\ (-) -5b + 7c + 6a \\ \hline (+) \quad (-) \quad (-) \\ \hline 9b - 10c - a \end{array}$$

$$(b) \quad \begin{array}{r} 4xy + 5x^2 + y^2 - 8 \\ (-) 3xy - x^2 - 6y^2 + 5 \\ \hline (-) \quad (+) \quad (+) \quad (-) \\ \hline xy + 6x^2 + 7y^2 - 13 \end{array}$$

$$(c) \quad \begin{array}{r} -3z^2 + 4y^2 - 4yz \\ (-) 3z^2 + 20y^2 + 6yz \\ \hline (-) \quad (-) \quad (-) \\ \hline -6z^2 - 16y^2 - 10yz \end{array}$$

$$(d) \quad \begin{array}{r} -6xy + 7 + 10y^2x^2 \\ (-) +6xy - 7 - 11x^2y^2 \\ \hline (-) \quad (+) \quad (+) \\ \hline -12xy + 14 + 21x^2y^2 \end{array}$$

$$(e) \quad \begin{array}{r} 8xy + 12 - 9y^2 \\ (-) -7xy + 9 + 8y^2 \\ \hline (+) \quad (-) \quad (-) \\ \hline 15xy + 3 - 17y^2 \end{array}$$

$$(f) \quad \begin{array}{r} -x^3 + 4x^2y - 3xy \\ (-) +x^3 + 2x^2y + 6xy \\ \hline (-) \quad (-) \quad (-) \\ \hline -2x^3 + 2x^2y - 9xy \end{array}$$

$$5. (a) 3x^3y - 6x + 4xy^2 + 4x^3y - 2x^3y + 8x - 8xy^2 \\ = (3 + 4 - 2)x^3y + (-6 + 8)x + (4 - 8)xy^2 \\ = 5x^3y + 2x - 4xy^2$$

$$(b) a^3b + ba^3 + 2ab^3 - 3a^3b - 6ab^3 + 4a^3b \\ = (1 + 1 - 3 + 4)a^3b + (2 - 6)ab^3 \\ = 3a^3b - 4ab^3$$

$$(c) x^4 + 4x^3y^2 - 3x^3 + 4x^3 - 4x^4 + 9x^3y^2 \\ = (1 - 4)x^4 + (4 + 9)x^3y^2 + (-3 + 4)x^3 \\ = -3x^4 + 13x^3y^2 + x^3$$

$$(d) 2x^3 - 4x^2 + y^3 + 4x^3 - 6y^3 + 8x^2 + 7y \\ = (2 + 4)x^3 + (-4 + 8)x^2 + (1 - 6)y^3 + 7y \\ = 6x^3 + 4x^2 - 5y^3 + 7y$$

$$(e) 9xyz - 7y^2z + 6xyz + 6zy^2 - 3yzx - 3y^2z \\ = (9 + 6 - 3)xyz + (-7 + 6 - 3)y^2z \\ = 12xyz - 4y^2z$$

$$6. (4x^3 - 2x^2 + 3 + 5x + 4x^2 - 9x + 8 - 3x^3) \\ - (8x^3 + 4x^2 - 9x + 5) \\ = (x^3 + 2x^2 - 4x + 11) - 8x^3 - 4x^2 + 9x - 5 \\ = (1 - 8)x^3 + (2 - 4)x^2 + (-4 + 9)x + 11 - 5 \\ = -7x^3 - 2x^2 + 5x + 6$$

7. Required algebraic expression

$$\begin{aligned} &= (-6x^3 - 2x^2y + 8x - 5) - (4x^2y + 5x^3 - 6x + 4) \\ &= -6x^3 - 2x^2y + 8x - 5 - 4x^2y - 5x^3 + 6x - 4 \\ &= (-6 - 5)x^3 + (-2 - 4)x^2y + (8 + 6)x - 5 - 4 \\ &= -11x^3 - 6x^2y + 14x - 9 \end{aligned}$$

8. $(-8a^3b + 5b^2) - (10a^3b - 6b^2 + 5)$

$$\begin{aligned} &= -8a^3b + 5b^2 - 10a^3b + 6b^2 - 5 \\ &= (-8 - 10)a^3b + (5 + 6)b^2 - 5 \\ &= -18a^3b + 11b^2 - 5 \end{aligned}$$

9. $(7x^2y + 3xyz - 6) - (-9x^2y + 4xyz + 8)$

$$\begin{aligned} &= 7x^2y + 3xyz - 6 + 9x^2y - 4xyz - 8 \\ &= (7 + 9)x^2y + (3 - 4)xyz - 6 - 8 \\ &= 16x^2y - xyz - 14 \end{aligned}$$

10. $A - B - C = (3x^2 - 4x + 8) - (x^2 + 7x - 10)$

$$\begin{aligned} &\quad - (-6x^2 - 3x + 2) \\ &= 3x^2 - 4x + 8 - x^2 - 7x + 10 + 6x^2 + 3x - 2 \\ &= 8x^2 - 8x + 16 \end{aligned}$$

11. $A + B + C = x - 2 + y + 2 - x + 2y = 3y$

12. $A + B + C = (4a^3 - 3a^2y + 8b) + (3a^3 + 4a^2b$

$$\begin{aligned} &\quad - 7b) + (-7a^3 - a^2b - b) \\ &= (4 + 3 - 7)a^3 + (-3 + 4 - 1)a^2b + (8 - 7 - 1)b \\ &= 0 \times a^3 + 0 \times a^2b + 0 \times b \\ &= 0 \end{aligned}$$

➤ HOTS

1. If they operate at the same time, their displays do not show the same numbers.
2. (a) True (b) False
3. Shaju is correct because 3 and 4 are constants and they form one term.

➤ NCERT CORNER

1. Number of rows = n
Number of cadets in a row = 5
 \therefore Number of cadets, when
 $n = 1,$ is 5 or $5 \times n$
 $n = 2,$ is 10 or $5 \times n$
 $n = 3,$ is 15 or $5 \times n$
Thus, the rule to find the cadets in n rows is $5n$.
2. Age of Radha = x years
 \therefore Leela is 4 years younger than Radha.
 \therefore Age of Leela = $(x - 4)$ years

3. The length of an edge of the cube = l (as shown in figure)

\therefore Sum of the lengths of all (12) edges of the cube
 $= 12 \times l = 12l$

4. Let a, b and c be three variables.

We can take any numerical value for each variable.
Then, $(a + b) + c = a + (b + c)$

This property is known as ‘‘associativity of addition of numbers’’.

5. Given in answersheet.

14 Linear Equations

➤ EXERCISE 14.1

1. (a) $5m = 60, m = 10$
LHS, $5m = 5 \times 10 = 50$
Here LHS \neq RHS
So, it does not satisfy
 - (b) $n + 12 = 30, n = 18$
LHS, $n + 12 = 18 + 12 = 30$
Here LHS = RHS
So, it satisfies.
 - (c) $r - 3 = -3, r = 0$
LHS, $0 - 3 = -3$
Here LHS = RHS
So, it satisfies.
 - (d) $\frac{m}{2} = 7, m = 16$
LHS, $\frac{m}{2} = \frac{16}{2} = 8$
Here LHS \neq RHS
So, it does not satisfy.
 - (e) $4x - 3 = 9, x = 3$
LHS, $4x - 3 = 4 \times 3 - 3 = 12 - 3 = 9$
Here, LHS = RHS
So, it satisfies.
2. Given in answersheet.
 3. Given in answersheet.
 4. Given in answersheet.
 5. Given in answersheet.
 6. Given in answersheet.
 7. (a) $y + 7 = 10$
Let $y = 1$
LHS, $1 + 7 = 8 \neq 10$
Let $y = 2$
LHS, $2 + 7 = 9 \neq 10$

Let $y = 3$
 LHS, $3 + 7 = 10 = 10$
 So $y = 3$

(b) $4x = 24$
 Let $x = 3$,
 LHS, $4 \times 3 = 12 \neq 24$
 Let $x = 5$
 LHS $4 \times 5 = 20 \neq 24$
 Let $x = 6$
 LHS, $4 \times 6 = 24 = 24$
 So, $x = 6$

(c) $\frac{m}{7} = 9$
 Let $m = 42$
 LHS, $\frac{42}{7} = 6 \neq 9$
 Let $m = 56$
 LHS, $\frac{56}{7} = 8 \neq 9$
 Let $m = 63$
 LHS, $\frac{63}{7} = 9 = 9$
 So, $m = 63$

(d) $\frac{p}{4} - 8 = 4$
 Let $p = 24$
 LHS, $\frac{24}{4} - 8 = 6 - 8 = -2 \neq 4$
 Let $p = 36$
 LHS, $\frac{36}{4} - 8 = 9 - 8 = 1 \neq 4$
 Let $p = 48$
 LHS, $\frac{48}{4} - 8 = 12 - 8 = 4 = 4$
 So, $p = 48$

(e) $12 + k = 18$
 Let $k = 4$
 LHS, $12 + 4 = 16 \neq 18$
 Let $k = 6$
 LHS, $12 + 6 = 18$
 So, $k = 6$

(f) $z - 3 = 2z - 5$
 Let $z = 1$
 LHS, $1 - 3 = -2$
 RHS $2 \times 1 - 5 = 2 - 5 = -3$
 So, $-2 \neq -3$

Let $z = 2$
 LHS, $2 - 3 = -1$
 RHS, $2 \times 2 - 5 = 4 - 5 = -1$
 So, LHS = RHS
 So, $z = 2$

(g) $2x - 3 = x$
 Let $x = 1$
 LHS, $2 \times 1 - 3 = 2 - 3 = -1$
 and RHS, 1
 Let $x = 3$
 LHS, $2 \times 3 - 3 = 6 - 3 = 3$
 and RHS, $x = 3$
 So, $x = 3$

(h) $\frac{1}{3}m + 8 = 11$
 Let $m = 6$
 LHS, $\frac{6}{3} + 8 = 2 + 8 = 10 \neq 11$
 Let $m = 9$
 LHS, $\frac{9}{3} + 8 = 3 + 8 = 11 = 11$
 So, $m = 9$

(i) $3y + 4 = 5y - 4$
 Let $y = 2$
 LHS, $3 \times 2 + 4 = 6 + 4 = 10$
 RHS, $5 \times 2 - 4 = 10 - 4 = 6$
 $10 \neq 6$
 Let $y = 4$
 LHS, $3 \times 4 + 4 = 12 + 4 = 16$
 RHS, $5 \times 4 - 4 = 20 - 4 = 16$
 So, LHS = RHS
 So, $y = 4$

(j) $4m + 9 = 2m - 3$
 Let $m = 3$
 LHS, $4 \times 3 + 9 = 12 + 9 = 21$
 RHS, $2 \times 3 - 3 = 6 - 3 = 3$
 So, LHS \neq RHS
 Let $m = 5$
 LHS, $4 \times 5 + 9 = 20 + 9 = 29$
 RHS, $2 \times 5 - 3 = 10 - 3 = 7$
 So, LHS \neq RHS
 Let $m = -6$
 LHS, $4 \times -6 + 9 = -24 + 9 = -15$
 $2 \times -6 - 3 = -12 - 3 = -15$
 Now, LHS = RHS
 So, $m = -6$

EXERCISE 14.2

1. $m - 4 = 6$

$$\begin{aligned} m - 4 + 4 &= 6 + 4 \\ m &= 10 \end{aligned}$$

2. $n + 6 = 10$

$$\begin{aligned} n + 6 - 6 &= 10 - 6 \\ n &= 4 \end{aligned}$$

3. $4x + 6 = 18$

$$\begin{aligned} 4x + 6 - 6 &= 18 - 6 \\ 4x &= 12 \\ \frac{4x}{4} &= \frac{12}{4} \\ x &= 3 \end{aligned}$$

4. $3p + 4 = 22$

$$\begin{aligned} 3p + 4 - 4 &= 22 - 4 \\ 3p &= 18 \\ \frac{3p}{3} &= \frac{18}{3} \\ p &= 6 \end{aligned}$$

5. $\frac{m}{6} = 12$

$$\begin{aligned} \frac{m}{6} \times 6 &= 12 \times 6 \\ m &= 72 \end{aligned}$$

6. $\frac{x}{4} - 8 = 2$

$$\begin{aligned} \frac{x}{4} - 8 + 8 &= 2 + 8 \\ \frac{x}{4} &= 10 \\ \frac{x}{4} \times 4 &= 10 \times 4 \\ x &= 40 \end{aligned}$$

7. $\frac{4l}{5} = 16$

$$\begin{aligned} \frac{4l}{5} \times 5 &= 16 \times 5 \\ 4l &= 80 \\ \frac{4l}{4} &= \frac{80}{4} \\ l &= 20 \end{aligned}$$

8. $12 - y = 5$

$$\begin{aligned} 12 - y - 12 &= 5 - 12 \\ -y &= -7 \\ y &= 7 \end{aligned}$$

9. $14 - 2m = 4$

$$\begin{aligned} 14 - 2m - 14 &= 4 - 14 \\ -2m &= -10 \\ \frac{2m}{-2} &= \frac{-10}{-2} \\ m &= 5 \end{aligned}$$

10. $4m - 5 = 19$

$$\begin{aligned} 4m - 5 + 5 &= 19 + 5 \\ 4m &= 24 \\ \frac{4m}{4} &= \frac{24}{4} \\ m &= 6 \end{aligned}$$

11. $\frac{p}{5} - 7 = 2$

$$\begin{aligned} \frac{p}{5} - 7 + 7 &= 2 + 7 \\ \frac{p}{5} &= 9 \\ \frac{p}{5} \times 5 &= 9 \times 5 \\ p &= 45 \end{aligned}$$

12. $8k + 3 = 11$

$$\begin{aligned} 8k + 3 - 3 &= 11 - 3 \\ 8k &= 8 \\ \frac{8k}{8} &= \frac{8}{8} \\ k &= 1 \end{aligned}$$

13. $\frac{n}{4} - 5 = \frac{n}{6} + \frac{1}{2}$

$$\begin{aligned} \frac{n}{4} - \frac{n}{6} &= \frac{1}{2} + 5 \\ \frac{3n - 2n}{12} &= \frac{1 + 10}{2} \\ \frac{n}{12} &= \frac{11}{2} \\ n &= \frac{11 \times 12}{2} = 66 \end{aligned}$$

For verification :

$$\begin{aligned} \text{LHS} &= \frac{n}{4} - 5 \\ \Rightarrow \frac{66}{4} - 5 &= \frac{66 - 20}{4} = \frac{46}{4} = \frac{23}{2} \\ \text{RHS} &= \frac{n}{6} + \frac{1}{2} \\ &= \frac{66}{6} + \frac{1}{2} = 11 + \frac{1}{2} \\ &= \frac{22 + 1}{2} = \frac{23}{2} \end{aligned}$$

$$14. \frac{2m}{3} + 8 = \frac{m}{2} - 1$$

$$\frac{2m}{3} - \frac{m}{2} = -1 - 8$$

$$\frac{4m - 3m}{6} = -9$$

$$\frac{m}{6} = -9$$

$$m = -9 \times 6 = -54$$

For verification :

$$\text{LHS} = \frac{2m}{3} + 8$$

$$= \frac{2 \times (-54)}{3} + 8$$

$$= 2 \times (-18) + 8 = -36 + 8 = -28$$

$$\text{RHS} = \frac{m}{2} - 1$$

$$= \frac{-54}{2} - 1 = -27 - 1 = -28$$

$$15. \frac{2x}{5} - \frac{3}{2} = \frac{x}{2} + 1$$

$$\frac{2x}{5} - \frac{x}{2} = 1 + \frac{3}{2}$$

$$\frac{4x - 5x}{10} = \frac{2 + 3}{2}$$

$$-\frac{x}{10} = \frac{5}{2}$$

$$-x = \frac{5 \times 10}{2} = 25$$

$$x = -25$$

For verification :

$$\text{LHS} = \frac{2x}{5} - \frac{3}{2} = \frac{2 \times (-25)}{5} - \frac{3}{2}$$

$$= 2 \times (-5) - \frac{3}{2}$$

$$= -10 - \frac{3}{2}$$

$$= \frac{-20 - 3}{2} = \frac{-23}{2}$$

$$\text{RHS} = \frac{x}{2} + 1 = \frac{(-25)}{2} + 1$$

$$= \frac{-25 + 2}{2} = \frac{-23}{2}$$

$$16. \frac{x-3}{5} - 2 = \frac{2x}{5}$$

$$\frac{x-3}{5} - \frac{2x}{5} = 2$$

$$\frac{x-3-2x}{5} = 2$$

$$-x-3 = 2 \times 5$$

$$-x-3 = 10$$

$$-x = 10 + 3 = 13$$

$$x = -13$$

For verification :

$$\text{LHS} = \frac{x-3}{5} - 2 = \frac{-13-3}{5} - 2$$

$$= \frac{-16}{5} - 2 = \frac{-16-10}{5}$$

$$= \frac{-26}{5}$$

$$\text{RHS} = \frac{2x}{5} = \frac{2 \times (-13)}{5}$$

$$= \frac{-26}{5}$$

$$17. \frac{3x}{10} - 4 = 14$$

$$\frac{3x}{10} = 14 + 4$$

$$\frac{3x}{10} = 18$$

$$3x = 18 \times 10$$

$$3x = 180$$

$$x = \frac{180}{3}$$

$$= 60$$

For verification :

$$\text{LHS} = \frac{3x}{10} - 4 = \frac{3 \times 60}{10} - 4$$

$$= 18 - 4 = 14$$

$$\text{RHS} = 14$$

$$18. \frac{3}{4}(x-1) = x-3$$

$$\frac{3}{4}x - \frac{3}{4} = x - 3$$

$$\frac{3}{4}x - x = -3 + \frac{3}{4}$$

$$\frac{3x - 4x}{4} = \frac{-12 + 3}{4}$$

$$\frac{-x}{4} = \frac{-9}{4}$$

$$x = \frac{9}{4} \times 4$$

$$= 9$$

For verification :

$$\text{RHS} = \frac{3}{4}(x-1) = \frac{3}{4}(9-1) = \frac{3}{4} \times 8 = 6$$

$$\text{LHS} = x - 3 = 9 - 3 = 6$$

19. $3(2-5x) - 2(1-6x) = 1$

$$6 - 15x - 2 + 12x = 1$$

$$-15x + 12x + 6 - 2 = 1$$

$$-3x = 1 - 4$$

$$-3x = -3$$

$$x = \frac{-3}{-3} = 1$$

For verification :

$$\text{LHS} = 3(2-5x) - 2(1-6x)$$

$$= 3(2-5 \times 1) - 2(1-6 \times 1)$$

$$= 3(2-5) - 2(1-6)$$

$$= 3 \times (-3) - 2 \times (-5)$$

$$= -9 + 10 = 1 = \text{RHS}$$

⇒ EXERCISE 14.3

1. Given in answerheet.

2. Let number = x

$$4x - 11 = 89$$

$$4x = 89 + 11$$

$$4x = 100$$

$$x = \frac{100}{4} = 25$$

3.

$$5x = x + 80$$

$$5x - x = 80$$

$$4x = 80$$

$$x = 20$$

4. Let a number = x

Three consecutive numbers = $x, x + 1, x + 2$

$$x + x + 1 + x + 2 = 114$$

$$3x + 3 = 114$$

$$3(x + 1) = 114$$

$$x + 1 = \frac{114}{3}$$

$$x + 1 = 38$$

$$x = 38 - 1 = 37$$

Numbers = 35, 36, 37.

5. Let number = x

$$3x + 5 = 50$$

$$3x = 50 - 5$$

$$3x = 45$$

$$x = \frac{45}{3} = 15$$

6. Let smaller number = x

$$x + (x + 18) = 92$$

$$2x + 18 = 92$$

$$2x = 92 - 18$$

$$2x = 74$$

$$x = \frac{74}{2} = 37$$

Smaller number = 37

Greater number = $x + 18 \Rightarrow 37 + 18 = 55$

7. Let a number = x

$$x + (3x) = 124$$

$$4x = 124$$

$$x = \frac{124}{4} = 31$$

Other number = $3x = 3 \times 31 = 93$.

8. Let number = x

Other number = $5x$

$$5x - x = 132$$

$$4x = 132$$

$$x = \frac{132}{4} = 33$$

Other number = $5x = 5 \times 33 = 165$.

9. Let an odd number = x

Second odd number = $x + 2$

Third odd number = $x + 4$

$$x + x + 2 + x + 4 = 21$$

$$3x + 6 = 21$$

$$3x = 21 - 6$$

$$3x = 15$$

$$x = \frac{15}{3} = 5$$

Numbers are $x, x + 2$ and $x + 4 = 5, 7, 9$.

10. Let Ajay's present age = x years

Reena's age = $x + 6$

$$x + (x + 6) = 28$$

$$2x + 6 = 28$$

$$2x = 28 - 6$$

$$2x = 22$$

$$x = \frac{22}{2} = 11 \text{ years}$$

Reena's present age = $x + 6 = 11 + 6 = 17$ years.

11. Let son's present age = x years

Father's present age = $4x$ years

Son's age after 16 years = $x + 16$ years

Father's age after 16 years = $(4x + 16)$ years

$$4x + 16 = 2(x + 16)$$

$$4x + 16 = 2x + 32$$

$$4x - 2x = 32 - 16$$

$$2x = 16$$

$$x = \frac{16}{2} = 8$$

Son's present age = 8 years

Father's present age = $4x = 4 \times 8 = 32$ years

12. Let son's present age = x years

His father's present age = $3x$ years

Son's age five years ago = $(x - 5)$ years

Father's age five years ago = $(3x - 5)$ years

$$3x - 5 = 4(x - 5)$$

$$3x - 5 = 4x - 20$$

$$3x - 4x = -20 + 5$$

$$-x = -15$$

$$x = 15$$

Son's present age = 15 years

Father's present age = $3x = 3 \times 15 = 45$ years

13. Let Fatima's present age = x years

After 16 years Fatima's age = $x + 16$ years

$$3x = x + 16$$

$$3x - x = 16$$

$$2x = 16$$

$$x = 8$$

Present age = 8 years

14. Let Rahim's age = x years

Rahim's age 8 years ago = $(x - 8)$ years

Rahim's age after 32 years = $(x + 32)$ years

$$5(x - 8) = x + 32$$

$$5x - 40 = x + 32$$

$$5x - x = 32 + 40$$

$$4x = 72$$

$$x = \frac{72}{4} = 18$$

Rahim's present age = 18 years

15. Let the number of 50-paisa coins be x .

Then, the number of 25-paisa coins will be $4x$.

According to the question,

$$0.50x + 0.25(4x) = 30$$

$$0.5x + x = 30$$

$$1.5x = 30$$

$$\frac{1.5x}{1.5} = \frac{30}{1.5}$$

$$x = 20$$

Thus, the number of 50-paisa coins is 20.

Number of 25-paisa coins = $4x = 4 \times 20 = 80$

16. Let price of a pen = ₹ x

$$5x = 3x + 17$$

$$5x - 3x = 17$$

$$2x = 17$$

$$x = \frac{17}{2} = 8.5$$

Price of the pen = ₹ 8.5

⇒ HOTS

- Given in answersheet.
- Given in answersheet.
- Let x be the years for which the equation will be true.

Therefore,

$$28 + x = 2(5 + x)$$

$$28 + x = 10 + 2x$$

$$x - 2x = 10 - 28$$

$$-x = -18$$

$$x = 18 \text{ years}$$

- Let the number of ten-rupee coins be x .

Then the number of five-rupee coins = $x + 2$.

$$5(x + 2) + 10x = 100$$

$$5x + 10 + 10x = 100$$

$$5x + 10x = 100 - 10$$

$$15x = 90$$

$$x = \frac{90}{15}$$

$$= 6 \text{ coins}$$

Number of ten-rupee coins = 6 coins

Number of five-rupee coins = $x + 2 = 6 + 2 = 8$ coins.

⇒ NCERT CORNER

- (a) $17 = x + 7$

It is an equation because it has '=' sign
Variable = x .

- (b) $(t - 7) > 5$

It is not an equation because it has '>' sign.
Variable = t .

- (c) $\frac{4}{2} = 2$

It is an equation because it has '=' sign.
There is no variable.

- (d) $(7 \times 3) - 19 = 8$

It is an equation because it has '=' sign.
There is no variable.

- (e) $5 \times 4 - 8 = 2x$

It is an equation because it has '=' sign.
Variable = x .

- (f) $x - 2 = 0$

It is an equation because it has '=' sign.
Variable = x .

(g) $2m < 30$
It is not an equation because it has ' $<$ ' sign.
Variable = m .

(h) $2n + 1 = 11$
It is an equation because it has '=' sign.
Variable = n .

(i) $7 = (11 \times 5) - (12 \times 4)$
It is an equation because it has '=' sign.
There is no variable.

(j) $7 = (11 \times 2) + p$
It is an equation because it has '=' sign.
Variable = p .

(k) $20 = 5y$
It is an equation because it has '=' sign.
Variable = y .

(l) $\frac{3q}{2} < 5$
It is not an equation because it has ' $<$ ' sign.
Variable = q .

(m) $z + 12 > 24$
It is not an equation because it has '>' sign.
Variable = z .

(n) $20 - (10 - 5) = 3 \times 5$
It is an equation because it has '=' sign.
There is no variable.

(o) $7 - x = 5$
It is an equation because it has '=' sign.
Variable = x .

2. (a) For $m = 10$
L.H.S. = $5 \times 10 = 50$. Here L.H.S. \neq R.H.S.
For $m = 5$

L.H.S. = $5 \times 5 = 25$. Here L.H.S. \neq R.H.S.
For $m = 12$
L.H.S. = $5 \times 12 = 60$. Here L.H.S. = R.H.S.

For $m = 15$
L.H.S. = $5 \times 15 = 75$. Here L.H.S. \neq R.H.S.
Hence, 12 is a solution of equation $5m = 60$.

(b) For $n = 12$
L.H.S. = $12 + 12 = 24$. Here L.H.S. \neq R.H.S.
For $n = 8$

L.H.S. = $8 + 12 = 20$. Here L.H.S. = R.H.S.
For $n = 20$
L.H.S. = $20 + 12 = 32$. Here L.H.S. \neq R.H.S.

For $n = 0$
L.H.S. = $0 + 12 = 12$. Here L.H.S. \neq R.H.S.
Hence, 8 is a solution of equation $n + 12 = 20$.

(c) For $p = 0$
L.H.S. = $0 - 5 = -5$. Here L.H.S. \neq R.H.S.
For $p = 10$

L.H.S. = $10 - 5 = 5$. Here L.H.S. = R.H.S.
For $p = 5$
L.H.S. = $5 - 5 = 0$. Here L.H.S. \neq R.H.S.

For $p = -5$
L.H.S. = $(-5) - 5 = -10$. Here L.H.S. \neq R.H.S.
Hence, 10 is a solution of equation $p - 5 = 5$.

(d) For $q = 7$
L.H.S. = $\frac{7}{2} \neq 7$. Here L.H.S. \neq R.H.S.

For $q = 2$
L.H.S. = $\frac{2}{2} = 1$. Here L.H.S. \neq R.H.S.

For $q = 10$
L.H.S. = $\frac{10}{2} = 5$. Here L.H.S. \neq R.H.S.

For $q = 14$
L.H.S. = $\frac{14}{2} = 7$. Here L.H.S. = R.H.S.

Hence, 14 is a solution of equation $\frac{q}{2} = 7$.

(e) For $r = 4$
L.H.S. = $4 - 4 = 0$. Here L.H.S. = R.H.S.
For $r = -4$

L.H.S. = $(-4) - 4 = -8$. Here L.H.S. \neq R.H.S.
For $r = 8$
L.H.S. = $8 - 4 = 4$. Here L.H.S. \neq R.H.S.

For $r = 0$
L.H.S. = $0 - 4 = -4$. Here L.H.S. \neq R.H.S.
Hence, 4 is a solution of equation $r - 4 = 0$.

(f) For $x = -2$
L.H.S. = $(-2) + 4 = 2$. Here L.H.S. = R.H.S.
For $x = 0$

L.H.S. = $0 + 4 = 4$. Here L.H.S. \neq R.H.S.
For $x = 2$
L.H.S. = $2 + 4 = 6$. Here L.H.S. \neq R.H.S.

For $x = 4$
L.H.S. = $4 + 4 = 8$. Here L.H.S. \neq R.H.S.
Hence, -2 is a solution of equation $x + 4 = 2$.

15 Ratio, Proportion and Unitary Method

EXERCISE 15.1

1. (a) $\frac{48}{60} = \frac{4}{5} = 4 : 5$

$$(b) 80 \text{ paise to ₹ } 4 = \frac{(80)P}{(4 \times 100)P} = \frac{1}{5} = 1:5$$

$$(c) ₹ 5 \text{ to } 625 \text{ paise}$$

$$₹ 1 = 100 \text{ paise}$$

$$₹ 5 = (5 \times 100) \text{ paise} = 500 \text{ paise}$$

$$\therefore \frac{500}{625} = \frac{4}{5} = 4:5$$

$$(d) 45 \text{ minutes to } 3 \text{ hours}$$

$$1 \text{ hour} = 60 \text{ minutes}$$

$$\therefore 3 \text{ hours} = (3 \times 60) \text{ minutes} = 180 \text{ minutes}$$

$$\therefore 45 \text{ minutes to } 3 \text{ hours} = \frac{45}{180} = \frac{1}{4} = 1:4$$

$$(e) 1 \text{ kg} = 1000 \text{ g}$$

$$\therefore 4 \text{ kg} = 4 \times 1000 = 4000 \text{ g}$$

$$\therefore 4 \text{ kg to } 600 \text{ g} = \frac{4000}{600} = \frac{20}{3} = 20:3$$

$$(f) 1 \text{ km} = 1000 \text{ m}$$

$$\therefore 3 \text{ km} = 3 \times 1000 = 3000 \text{ m}$$

$$\therefore 800 \text{ m to } 3 \text{ km} = \frac{800}{3000} = \frac{4}{15} = 4:15$$

$$(g) 1 \text{ min} = 60 \text{ seconds}$$

$$4 \text{ min} = 4 \times 60 = 240 \text{ seconds}$$

$$\therefore 4 \text{ min to } 45 \text{ sec} = \frac{240}{45} = \frac{16}{3} = 16:3$$

$$(h) 1 \text{ year} = 12 \text{ months}$$

$$\therefore 2 \text{ years} = (2 \times 12) = 24 \text{ months}$$

$$\therefore 2 \text{ years to } 9 \text{ months} = \frac{24}{9} = \frac{8}{3} = 8:3$$

$$(i) \text{ A dozen to a score} = \frac{12}{20} = \frac{3}{5} = 3:5$$

$$(j) 1 \text{ m} = 100 \text{ cm}$$

$$\therefore 2 \text{ m} = (2 \times 100) = 200 \text{ cm}$$

$$= 45 \text{ cm to } 2 \text{ m} = \frac{45}{200} = \frac{9}{40} = 9:40$$

$$2. \text{ Ratio of length to breadth} = \frac{120}{70} = \frac{12}{7} = 12:7$$

$$3. \text{ Number of boys} = 1200 - 750 = 450$$

$$\text{Ratio of the boys to girls} = \frac{450}{750} = \frac{3}{5} = 3:5$$

$$4. \text{ Ratio of the number of teachers to the number of students} = \frac{119}{3400} = \frac{7}{200} = 7:200$$

$$5. \text{ Monthly salary} = ₹ 28,800$$

$$\text{Saving} = ₹ 4200$$

$$\text{Expenditure} = ₹ (28800 - 4200) = ₹ 24600$$

$$(a) \text{ Income to savings} = \frac{28800}{4200} = 48:7$$

$$(b) \text{ Income to expenditure} = \frac{28800}{24600} = \frac{48}{41} = 48:41$$

$$(c) \text{ Saving to expenditure} = \frac{4200}{24600} = \frac{7}{41} = 7:41$$

$$6. \text{ Income of Mr Singh} = ₹ 2,56,000$$

$$\text{Income of Mrs Singh} = ₹ 3,20,000$$

$$(a) \text{ Ratio of their income} = \frac{256000}{320000} = \frac{4}{5} = 2:5$$

$$(b) \text{ Mr. Singh to total income} = \frac{256000}{576000} = \frac{4}{9} = 2:27$$

$$(c) \text{ Mrs. Singh to both} = \frac{320000}{576000} = \frac{5}{9} = 25:27$$

$$7. \text{ Total students} = 4320$$

$$\text{Number of girls} = 2300$$

$$\text{Number of boys} = 4320 - 2300 = 2020$$

$$(a) \text{ Number of boys to the total number of students} = \frac{2020}{4320} = \frac{101}{216} = 101:216$$

$$(b) \text{ Number of girls to the total number of students} = \frac{2300}{4320} = \frac{115}{216} = 115:216$$

$$8. \text{ Total students} = 1600$$

$$\text{Students opted cricket} = 480$$

$$\text{Students opted football} = 780$$

$$\text{Student opted basket ball} = 1600 - (480 + 780) = 1600 - 1260 = 340$$

$$(a) \text{ Cricket to football} = \frac{480}{780} = \frac{8}{13} = 8:13$$

$$(b) \text{ Football to basketball} = \frac{780}{340} = \frac{39}{17} = 39:17$$

$$(c) \text{ Basketball to total students} = \frac{340}{1600} = \frac{17}{80} = 17:80$$

$$9. \text{ Ratio of numbers} = 11:13$$

$$\text{Sum of ratio} = 11 + 13 = 24$$

$$\text{Sum of numbers} = 720$$

$$\text{So, first number} = \frac{11}{24} \times 720 = 330$$

$$\text{and second number} = \frac{13}{24} \times 720 = 390$$

$$10. \text{ Ratio} = 2:3:1$$

$$\text{Sum of ratio} = 2 + 3 + 1 = 6$$

$$\text{Total money} = ₹ 642$$

$$\text{First part} = \frac{2}{6} \times 642 = ₹ 214$$

$$\text{Second part} = \frac{3}{6} \times 642 = ₹ 321$$

$$\text{and third part} = \frac{1}{6} \times 642 = ₹ 107$$

11. Ratio = 7 : 8 : 10

$$\text{Sum of ratio} = 7 + 8 + 10 = 25$$

$$\text{Total money} = ₹ 300$$

$$\text{First part} = \frac{7}{25} \times 300 = ₹ 84$$

$$\text{Second part} = \frac{8}{25} \times 300 = ₹ 96$$

$$\text{and third part} = \frac{10}{25} \times 300 = ₹ 120$$

12. Ratio of zinc and copper = 5 : 7

$$\text{Total weight of alloy} = 4.8 \text{ kg}$$

$$\text{Sum of ratio} = 4 + 7 = 12$$

$$\text{Weight of zinc} = \frac{5}{12} \times 4.8 = 2 \text{ kg}$$

$$\text{Weight of copper} = \frac{7}{12} \times 4.8 = 2.8 \text{ kg}$$

13. Ratio of sides = 2 : 2 : 3

$$\text{Sum of ratio} = 2 + 2 + 3 = 7$$

$$\text{Perimeter of triangle} = 70 \text{ cm}$$

$$\text{So, length of first side} = \frac{2}{7} \times 70 = 20 \text{ cm}$$

$$\text{Length of second side} = \frac{2}{7} \times 70 = 20 \text{ cm}$$

$$\text{and length of third side} = \frac{3}{7} \times 70 = 30 \text{ cm}$$

14. Let Rahul gets x then Udit will get $2x$

and Naman will get $4x$

So, ratio of Naman, Udit and Rahul is 4 : 2 : 1

$$\text{Total money} = ₹ 630$$

$$\text{Sum of ratio} = 4 + 2 + 1 = 7$$

$$\text{So Naman will get} = \frac{4}{7} \times 630 = ₹ 360$$

$$\text{Udit will get} = \frac{2}{7} \times 630 = ₹ 180$$

$$\text{and Rahul will get} = \frac{1}{7} \times 630 = ₹ 90$$

15. Let Shaleen gets x

Then Sakshi will get $5x$

and Vaishali will get $3 \times 5x = 15x$

So, ratio of Vaishali, Sakshi and Shaleen is

$$= 15x : 5x : x \quad \text{or} \quad 15 : 5 : 1$$

$$\text{Total articles} = 1260$$

$$\text{So, Vaishali will get} = \frac{15}{21} \times 1260 = 900$$

$$\text{Sakshi will get} = \frac{5}{21} \times 1260 = 300$$

$$\text{and Shaleen will get} = \frac{1}{21} \times 1260 = 60$$

EXERCISE 15.2

1. (a) 32, 8, 16, 4

$$\text{Product of extremes} = 32 \times 4 = 128$$

$$\text{Product of means} = 8 \times 16 = 128$$

$$\text{Product of extremes} = \text{Product of means}$$

So, they are in proportion.

(b) 19, 20, 38, 40

$$\text{Product of extremes} = 19 \times 40 = 760$$

$$\text{Product of means} = 20 \times 38 = 760$$

$$\text{Product of extremes} = \text{Product of means}$$

So, they are in proportion.

(c) 24, 28, 36, 48

$$\text{Product of extremes} = 24 \times 48 = 1152$$

$$\text{Product of means} = 28 \times 36 = 1008$$

$$\text{Product of extremes} \neq \text{product of means}$$

So, they are not in proportion.

(d) 42, 16, 84, 32

$$\text{Product of extremes} = 42 \times 32 = 1344$$

$$\text{Product of means} = 16 \times 84 = 1344$$

$$\text{Product of extremes} = \text{product of means}$$

So, they are in proportion.

(e) 15, 45, 40, 120

$$\text{Product of extremes} = 15 \times 120 = 1800$$

$$\text{Product of means} = 45 \times 40 = 1800$$

$$\text{Product of extremes} = \text{Product of means}$$

So, they are in proportion.

(f) 15, 25, 36, 18

$$\text{Product of extremes} = 15 \times 18 = 270$$

$$\text{Product of means} = 25 \times 36 = 900$$

$$\text{Product of extremes} \neq \text{product of means}$$

So, they are not in proportion.

(g) 18, 20, 45, 50

$$\text{Product of extremes} = 18 \times 50 = 900$$

$$\text{Product of means} = 20 \times 45 = 900$$

$$\text{Product of extremes} = \text{Product of means}$$

So, they are in proportion.

(h) 15, 20, 25, 30

$$\text{Product of extremes} = 15 \times 30 = 450$$

$$\text{Product of means} = 20 \times 25 = 500$$

$$\text{Product of extremes} \neq \text{Product of means}$$

So, they are not in proportion.

2. (a) 9, 12, a , 8 are in proportion.

$$\text{So, } 9 \times 8 = 12 \times a$$

$$\text{or } a = \frac{72}{12}$$

$$a = 6$$

(b) $a, 4, 15, 30$ are in proportion.

$$\begin{aligned}\text{So, } a \times 30 &= 4 \times 15 \\ \therefore a &= \frac{60}{30} \text{ or } a = 2\end{aligned}$$

(c) $30, a, 45, 60$ are in proportion.

$$\begin{aligned}\text{So, } 30 \times 60 &= a \times 45 \\ \therefore a &= \frac{1800}{45} \text{ or } a = 40\end{aligned}$$

(d) $14, a, 7, 9$ are in proportion

$$\begin{aligned}\text{So, } 14 \times 9 &= a \times 7 \\ \therefore a &= \frac{14 \times 9}{7} \text{ or } a = 18\end{aligned}$$

(e) $25, 30, 40, a$ are in proportion

$$\begin{aligned}\text{So, } 25 \times a &= 30 \times 40 \\ \therefore a &= \frac{30 \times 40}{25} \text{ or } a = 48\end{aligned}$$

(f) $16, 24, 6, x$ are in proportion

$$\begin{aligned}\text{So, } 16 \times x &= 24 \times 6 \\ x &= \frac{24 \times 6}{16} \text{ or } x = 9\end{aligned}$$

(g) $8, 10, a, 25$ are in proportion

$$\begin{aligned}\text{So, } 8 \times 25 &= 10 \times a \\ \therefore a &= \frac{200}{10} \text{ or } a = 20\end{aligned}$$

(h) $36, 24, a, 16$ are in proportion

$$\begin{aligned}\text{So, } 36 \times 16 &= 24 \times a \\ \therefore a &= \frac{36 \times 16}{24} \text{ or } a = 24\end{aligned}$$

3. (a) $18, 42, 98$ are in proportion

$$\begin{aligned}\frac{18}{42} &= \frac{42}{98} \\ \Rightarrow \frac{3}{7} &= \frac{3}{7}\end{aligned}$$

Hence they are in proportion

(b) $25, 30, 36$

$$\begin{aligned}\frac{25}{30} &= \frac{30}{36} \\ \Rightarrow \frac{5}{6} &= \frac{5}{6}\end{aligned}$$

Hence, they are in proportion.

(c) $25, 20, 16$

$$\begin{aligned}\frac{25}{20} &= \frac{20}{16} \\ \Rightarrow \frac{5}{4} &= \frac{5}{4}\end{aligned}$$

So, they are in proportion.

(d) $48, 60, 75$

$$\frac{48}{60} = \frac{60}{75} \Rightarrow \frac{4}{5} = \frac{4}{5}$$

So, they are in proportion.

4. (a) $24, 36, b$

$$\begin{aligned}\text{So, } \frac{24}{36} &= \frac{36}{b} \\ \text{or } 24 \times b &= 36 \times 36 \\ \therefore b &= \frac{36 \times 36}{24} \text{ or } b = 54\end{aligned}$$

(b) $25, b, 36$

$$\begin{aligned}\text{So, } \frac{25}{b} &= \frac{b}{36} \\ \Rightarrow b^2 &= 25 \times 36 \\ \Rightarrow b^2 &= 5^2 \times 6^2 \\ \text{or } b &= 5 \times 6 = 30\end{aligned}$$

(c) $b, 45, 81$

$$\begin{aligned}\text{So, } \frac{b}{45} &= \frac{45}{81} \\ \Rightarrow b \times 81 &= 45 \times 45 \\ b &= \frac{45 \times 45}{81} \\ b &= 25\end{aligned}$$

(d) $b, 42, 98$

$$\begin{aligned}\text{So, } \frac{b}{42} &= \frac{42}{98} \\ \Rightarrow b \times 98 &= 45 \times 42 \\ \therefore b &= \frac{42 \times 42}{98} \text{ or } b = 18\end{aligned}$$

5. Let width of the field be x m.

$$\begin{aligned}\text{So, } 8 : 5 &= 400 : x \\ \text{or } 8 \times x &= 5 \times 400 \\ \therefore x &= \frac{5 \times 400}{8} \text{ or } x = 250 \text{ m}\end{aligned}$$

6. Let length of park be x m

$$\begin{aligned}\text{So, } 5 : 4 &= x : 100 \\ \Rightarrow 5 \times 100 &= 4 \times x \\ \Rightarrow x &= \frac{500}{4} \text{ or } x = 125 \text{ m}\end{aligned}$$

7. Let weight of zinc be x gm

$$\begin{aligned}\text{So, } 6 : 7 &= 37.5 : x \\ \Rightarrow 6 \times x &= 7 \times 37.5 \\ \Rightarrow x &= \frac{7 \times 37.5}{6} \\ x &= 43.75 \text{ gm}\end{aligned}$$

8. Let income be ₹ x
 So, $13 : 4 = x : 1696$
 $\Rightarrow 13 \times 1696 = 4 \times x$
 $\Rightarrow x = \frac{13 \times 1696}{4}$ or $x = 5512$
 So, Expenditure = ₹ $(5512 - 1696)$
 $= ₹ 3816$
9. Let expenditure be ₹ x
 So, $15 : 13 = 50625 : x$
 $\Rightarrow 15 \times x = 13 \times 50625$
 $\Rightarrow x = \frac{13 \times 50625}{15}$
 $x = 43875$
 So, Saving = ₹ $(50625 - 43875) = ₹ 6750$
10. Let number of girls be x
 (a) So, $4 : 5 = x : 630$
 $\Rightarrow 4 \times 630 = 5 \times x$
 $\Rightarrow x = \frac{4 \times 630}{5}$
 $x = 504$
 (b) Total students = $630 + 504 = 1134$

⇒ **EXERCISE 15.3**

1. Cost of 7 pens = ₹ 84
 Cost of 1 pen = ₹ $\frac{84}{7} = ₹ 12$
 So, Cost of 19 pens = ₹ $(12 \times 19) = ₹ 228$
2. Cost of 24 m cloth = ₹ 552
 Cost of 1 m cloth = ₹ $\frac{552}{24} = ₹ 23 = ₹ 23$
 So, cost of 18 cloth = ₹ $(23 \times 18) = ₹ 414$
3. Cost of 2 dozen soaps = ₹ 288
 Cost of one dozen soap = ₹ $\frac{288}{2} = ₹ 144$
 So, cost of 3 dozen soaps = ₹ $(144 \times 3) = ₹ 432$
4. Cost of 6 boxes of apples = ₹ 210
 \therefore Cost of 1 box apples = ₹ $\frac{210}{6} = ₹ 35$
 So, Cost of 11 boxes apple = ₹ $(35 \times 11) = ₹ 385$
5. 96 pins can be packed in 3 boxes
 \therefore 640 pins will be packed in $\frac{3}{96} \times 640 = 20$ boxes
6. A car travels in 12 l petrol = 180 km
 \therefore It will travel in 1 l = $\frac{180}{12} = 15$ km
 So, It will travel in 22 l = $15 \times 22 = 330$ km
7. For going 128 km, a motor bike need 2 l petrol
 For going 416 km, motorbike needed
 $= \frac{2}{128} \times 416 = 6.5$ l petrol
8. Rent of 4 months = ₹ 7200
 Rent of 1 month = ₹ $\frac{7200}{4} = ₹ 1800$
 So, rent of 1 year = ₹ $1800 \times 12 = ₹ 21600$
9. A bus covers 62 km distance in 1 hr
 It will cover 1 km in $\frac{1}{62}$ hr and 496 km = $\frac{496}{2}$
 $= 8$ hrs
10. Weight of 72 books = 9 kg
 \therefore Weight of 1 book = $\frac{9}{72}$ kg
 and weight of 20 books = $\frac{9}{72} \times 20 = 2.5$ kg
11. Weight of 25 bags = 60 kg
 \therefore Weight of 1 bag = $\frac{60}{25}$ kg
 and weight of 35 bags = $\frac{60}{25} \times 35 = 84$ kg
12. 36 men can reap a field in 25 days
 So, 1 man can reap in 25×36 days
 and 45 men can reap in $\frac{25 \times 36}{45} = 20$ days
13. 49 men can build a wall in 15 days
 So 1 man can build in 15×49 days
 and 35 men can build in $\frac{15 \times 49}{35} = 21$ days
14. 280 men consume in 32 days
 \therefore 1 man will consume in 280×32 days
 and 224 men will consume in $\frac{280 \times 32}{224} = 40$ days.
15. Cost of 15 pens = ₹ 150
 Cost of one pen = ₹ $\frac{150}{15} = ₹ 10$
 Cost of 8 pens = ₹ 72
 \therefore Cost of one pen = ₹ $\frac{72}{8} = ₹ 9$
 So, Manish's pen is cheaper.
16. Dhoni made runs in 7 overs = 56
 So, he made runs in 1 over = $\frac{56}{7} = 8$
 Yuvraj made runs in 9 overs = 63

So, he made runs in 1 over = $\frac{63}{9} = 7$

So, Dhoni made more runs per over.

⇒ HOTS

- (a) Ratio of present age of father to the present age of son = 42 : 14 = 3 : 1.
 (b) Age of father when son was 12 years old = age of father 2 years ago = 40 years.
 So, required ratio = 40 : 12 = 10 : 3.
 (c) Age of father after 10 years = 52 years.
 Age of son after 10 years = 24 years
 So, required ratio = 52 : 24 = 13 : 6.
 (d) Age of son when father was 30 years old = age of son 12 years ago = 2 years.
 So, required ratio = 30 : 2 = 15 : 1.

- Total weight of 25 bags of 50 kg each

$$= (50 \times 25) \text{ kg}$$

$$= 1250 \text{ kg}$$

Total weight of 35 bags of 40 kg each

$$= (40 \times 35) \text{ kg}$$

$$= 1400 \text{ kg}$$

$$\text{Cost of 1 kg of wheat} = ₹ \left(\frac{10000}{2500} \right)$$

[Less wheat, less cost]

$$\text{Cost of 1400 kg of wheat} = ₹ \left(\frac{10000}{1250} \times 1400 \right)$$

$$= ₹ 11200$$

Hence, the cost of 35 bags of 40 kg each is ₹ 11200.

⇒ NCERT CORNER

- (a) HCF of 81 and 108 is 27
 $\therefore \text{Ratio} = \frac{81}{108} = \frac{81 \div 27}{108 \div 27} = \frac{3}{4} = 3 : 4$
 (b) HCF of 98 and 63 is 7
 $\therefore \text{Ratio} = \frac{98}{63} = \frac{98 \div 7}{63 \div 7} = \frac{14}{9} = 14 : 9$
 (c) HCF of 33 and 121 is 11
 $\therefore \text{Ratio} = \frac{33}{121} = \frac{33 \div 11}{121 \div 11} = \frac{3}{11} = 3 : 11$
 (d) HCF of 30 and 45 is 15
 $\therefore \text{Ratio} = \frac{30}{45} = \frac{30 \div 15}{45 \div 15} = \frac{2}{3} = 2 : 3$

- (a) 40 persons : 200 persons = 40 : 200

$$= \frac{40}{200} = \frac{40 \div 40}{200 \div 40} = \frac{1}{5}$$

[\therefore HCF of 40 and 200 is 40]

$$₹ 15 : ₹ 75 = 15 : 75 = \frac{15}{75} = \frac{15 \div 15}{75 \div 15} = \frac{1}{5} = 1 : 5$$

[\therefore HCF of 15 and 75 is 15]

$$\therefore 40 : 200 = 15 : 75$$

\therefore 40 persons : 200 persons = ₹ 15 : ₹ 75 is true statement.

- (b) 7.5 litres : 15 litres = 7.5 : 15

$$= \frac{7.5}{15} = \frac{7.5 \times 10}{15 \times 10} = \frac{75}{150}$$

$$= \frac{75 \div 75}{150 \div 75} = \frac{1}{2} = 1 : 2$$

[\therefore HCF of 75 and 150 is 75]

$$5 \text{ kg} : 10 \text{ kg} = 5 : 10 = \frac{5}{10} = \frac{5 \div 5}{10 \div 5} = \frac{1}{2} = 1 : 2$$

[\therefore HCF of 5 and 10 is 5]

$$\therefore 7.5 : 15 = 5 : 10$$

\therefore 7.5 litres : 15 litres = 5 kg : 10 kg is true statement.

- (c) 99 kg : 45 kg = 99 : 45 = $\frac{99}{45} = \frac{99 \div 9}{45 \div 9} = \frac{11}{5}$

$$= 11 : 5$$

[\therefore HCF of 99 and 45 is 9]

$$₹ 44 : ₹ 20 = 44 : 20 = \frac{44}{20} = \frac{44 \div 4}{20 \div 4} = \frac{11}{5}$$

$$= 11 : 5$$

[\therefore HCF of 44 and 20 is 4]

$$\therefore 99 : 45 = 44 : 20$$

\therefore 99 kg : 45 kg = ₹ 44 : ₹ 20 is true statement.

- (d) 32 m : 64 m = 32 : 64 = $\frac{32}{64} = \frac{32 \div 32}{64 \div 32} = \frac{1}{2} = 1 : 2$

[\therefore HCF of 32 and 64 is 32]

$$6 \text{ sec} : 12 \text{ sec} = 6 : 12 = \frac{6}{12} = \frac{6 \div 6}{12 \div 6} = \frac{1}{2} = 1 : 2$$

[\therefore HCF of 6 and 12 is 6]

$$\therefore 32 : 64 = 6 : 12$$

\therefore 32 m : 64 m = 6 sec : 12 sec is true statement.

- (e) 45 km : 60 km = 45 : 60 = $\frac{45}{60} = \frac{45 \div 15}{60 \div 15} = \frac{3}{4}$

$$= 3 : 4$$

[\therefore HCF of 45 and 60 is 15]

$$12 \text{ hours} : 15 \text{ hours} = 12 : 15 = \frac{12}{15} = \frac{12 \div 3}{15 \div 3} = \frac{4}{5}$$

$$= \frac{4}{5} = 4 : 5$$

[\therefore HCF of 12 and 15 is 3]

$\therefore 45 : 60 \neq 12 : 15$

$\therefore 45 \text{ km} : 60 \text{ km} = 12 \text{ hours} : 15 \text{ hours}$ is not true statement.

3. Temperature dropped in 30 days = 15 degree

Temperature dropped in 1 day = $\frac{15}{30} = 0.5$ degree

Temperature dropped in 10 days = $0.5 \times 10 = 5$ degree

4. Weight of 72 books = 9 kg

Weight of 1 book = $\frac{9}{72} \text{ kg} = \frac{9 \div 9}{72 \div 9} = \frac{1}{8} \text{ kg}$

[\therefore HCF of 9 and 72 is 9]

Weight of 40 books = $\frac{1}{8} \times 40 = 5 \text{ kg}$.

16 Two Dimensional Reflection Symmetry (Linear Symmetry)

EXERCISE 16.1

1. Do it yourself.
2. Given in answersheet.
3. Given in answersheet.

EXERCISE 16.2

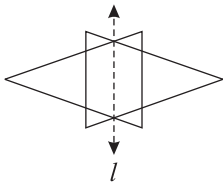
1. Do it yourself.
2. Do it yourself.

HOTS

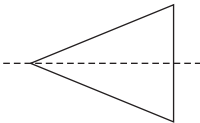
1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. Given in answersheet.
5. Given in answersheet.

NCERT CORNER

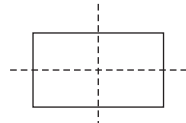
1.



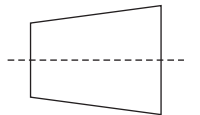
2. (a)



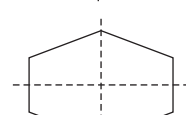
(b)



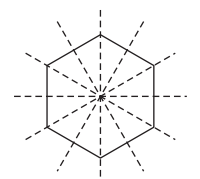
(c)



(d)



(e)



3. Taking the mirror image of A, we find that the letter A after reflection looks the same.



Taking the mirror image of B, we find that the letter B does not look the same.



Similarly, the mirror images of the given letters are given as :



The letters A, O, M, H, T, V and X looks the same after reflection because these letters have a vertical line of symmetry. The letters B, E, N, P, L and S do not look the same after reflection because these letters are not symmetrical.

17 Three Dimensional Shapes

EXERCISE 17.1

1. Given in answersheet.
2. Given in answersheet.
3. Given in answersheet.
4. Do it yourself.

HOTS

1. Given in answersheet.
2. Given in answersheet.

NCERT CORNER

1. Given in answersheet.
2. Given in answersheet.

18 Practical Geometry (Construction)

EXERCISE 18.1

1. Do it yourself.
2. Do it yourself.
3. Do it yourself.
4. Do it yourself.
5. Do it yourself.
6. Do it yourself.
7. Do it yourself.

EXERCISE 18.2

1. Do it yourself.
2. Do it yourself.
3. Do it yourself.
4. Do it yourself.
5. Do it yourself.
6. Do it yourself.

EXERCISE 18.3

1. Do it yourself.
2. Do it yourself.

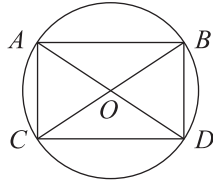
3. Do it yourself. 4. Do it yourself.
 5. Do it yourself. 6. Do it yourself.
 7. Do it yourself.

⇒ **HOTS**

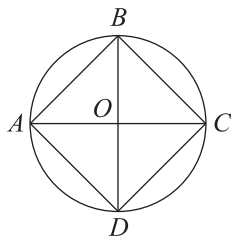
1. Do it yourself. 2. Do it yourself.
 3. Do it yourself.

⇒ **NCERT CORNER**

1. (i) In the given figure, AB and CD are two diameters. If we joining the ends of these two diameter, the figure obtained is a rectangle.



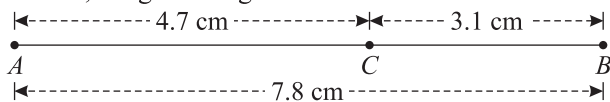
(ii) In the given figure, AB and CD are two diameters. If we joining the ends of these two diameters, we observe that these two diameters are perpendicular to each other.



2. Steps for construction :

- Step I :** Place the zero mark of the ruler at A .
Step II : Mark a point B at a distance 7.8 cm from A .
Step III : Mark another point C between A and B at distance 4.7 cm from A such that $\overline{AC} = 4.7$ cm.
Step IV : Measure the line segment \overline{BC} . We find that $\overline{BC} = 3.1$ cm.

Now, we get the figure as shown below :



Hence, \overline{AB} is a line segment of length 7.8 cm. On measurement, the length of \overline{BC} is 3.1 cm.

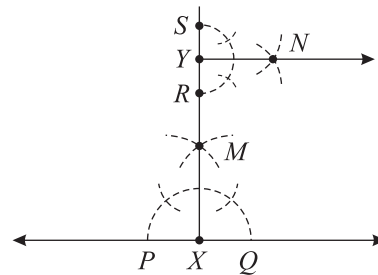
3. Steps for construction :

- Step I :** Draw the line segment \overline{AB} with any length.
Step II : Fix the compasses pointer on A and the pencil end on B . The opening of the instrument now gives the length of \overline{AB} .
Step III : Draw any line l . Choose a point A on l . Without changing the compasses setting, place the pointer on P .
Step IV : Strike an arc that cuts l at a point, say, X .
Step V : Now fix the compasses pointer on X . Strike an arc away from P that cuts l at a point, say, Q .
 Now, the length of \overline{PQ} is twice that of \overline{AB} .

4. Steps for construction :

- Step I :** Draw a line l with any length.
Step II : Mark a point X on it.
Step III : With X as centre and a suitable radius, draw an arc intersecting the line l at two points P and Q .
Step IV : With P and Q as centres and a radius greater than \overline{PX} , draw two arcs, which intersect each other at M .
Step V : Join XM and produce it to Y . Here, $\overline{XY} \perp l$.
Step VI : With Y as centre and a convenient radius, draw an arc intersecting \overline{XY} at two points R and S .
Step VII : With R and S as centres and a radius greater than \overline{YR} , draw two arcs, which intersect each other at N .
Step VIII : Join Y and N .

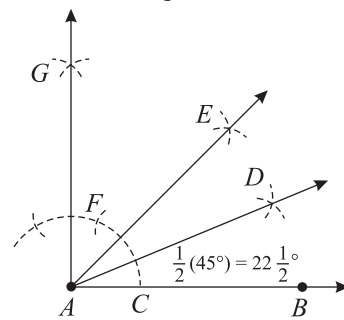
Now, we get the figure as shown below :



Hence, $\overline{XY} \perp l$.

5. Steps for construction :

- Step I :** Draw a ray \overrightarrow{AB} .
Step II : Construct $\angle BAE = 45^\circ$.
Step III : With centre C and radius more than CF , draw an arc.
Step IV : With the same radius and centre of F , draw another arc which intersects the arc at D .
Step V : Join AD and produce it.



Thus, \overline{AD} , bisects $\angle BAE$ into two equal parts, i.e.,

$$\angle BAD = \frac{1}{2} (45^\circ) = 22 \frac{1}{2}^\circ.$$