

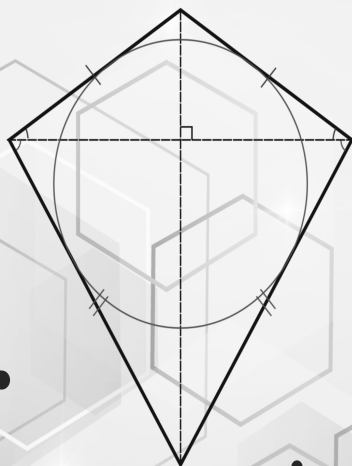


MATHS MAGIC

Teacher Manual

$$\pi = 3.1416$$

$$A^2 + B^2 = C^2$$



NEP 2020

**ENHANCED
EDITION**

6



Exercise 1.1

- (a) $<$ (b) $<$ (c) $<$ (d) $<$ (e) $<$ (f) $>$ (g) $<$ (h) $>$ (i) $>$ (j) $<$ (k) $>$ (l) $<$
- (a) 8138 is greater (b) 7245 is greater (c) 8261 is greater
(d) 2111 is greater (e) 3681 is greater (f) 5208 is greater
- (a) 6230 is smaller (b) 5479 is smaller (c) 121 is smaller
(d) 9326 is smaller (e) 1368 is smaller (f) 6193 is smaller
- (a) $1008 < 12650 < 50602 < 55010$ (b) $1076 < 10996 < 19576 < 56196$
(c) $15576 < 55722 < 66129 < 82156$ (d) $35829 < 38935 < 45927 < 90209$
- (a) $53176 > 53167 > 51178 > 50768$
(b) $29852 > 25196 > 19603 > 15218$
(c) $46033 > 3526 > 3525 > 3347$
(d) $56018 > 55217 > 29364 > 13007$

Exercise 1.2

- Numbers = 634, 346, 436, 643, 463, 364
Ascending order = 346, 364, 436, 463, 634, 643
- Number = 908, 809, 980, 890
Descending order = 980, 908, 890, 809
- (a) Greatest 4-digit number = 7542 Smallest 4-digit number = 2457
(b) Greatest 4-digit number = 9310 Smallest 4-digit number = 1039
(c) Greatest 4-digit number = 5430 Smallest 4-digit number = 3045
(d) Greatest 4-digit number = 7540 Smallest 4-digit number = 4057
- (a) Greatest 5-digit number = 99743 Smallest 5-digit number = 33479
(b) Greatest 5-digit number = 99410 Smallest 5-digit number = 10049
(c) Greatest 5-digit number = 88752 Smallest 5-digit number = 22578
(d) Greatest 5-digit number = 88731 Smallest 5-digit number = 11378
- (a) Greatest Number Smallest Number
Th H T O Th H T O
9 8 4 7 1 0 4 2
(b) Greatest number Smallest Number
Th H T O Th H T O
8 9 7 6 1 9 0 2
- Given number
Th H T O
5 1 3 0

New Numbers

1.	TH	H	T	O	Th	H	T	O
	1	5	3	0,	3	5	1	0
2.	TH	H	T	O	Th	H	T	O
	1	3	5	0,	3	1	5	0
3.	TH	H	T	O	Th	H	T	O
	1	3	0	5,	3	1	0	5
4.	TH	H	T	O				
	3	0	1	5				

and many more numbers.

Exercise 1.3

1. (a)

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	1	2	4	3	6	9	7	0

International System

Using Commas = 12, 436, 970

Number name = Twelve million, four hundred thirty-six thousand, nine hundred seventy.

(b) International place value chart

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
7	9	3	6	5	4	1	8	2

Using commas = 793, 654, 182

Number name = Seven hundred ninety-three million, six hundred fifty-four thousand, one hundred eighty-two.

(c) International Place Value Chart

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
1	0	3	8	5	4	1	7	9

Using commas = 103, 854, 179

Number name = One hundred three million, eight hundred fifty-four thousand, one hundred seventy nine.

(c) International Place Value Chart

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	4	2	5	6	0	2	4	7

Using Commas = 42, 560, 247

Number name = Forty-two million, five hundred sixty thousand, two hundred forty-seven.

(d) International Place Value Chart

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
9	1	4	0	6	5	4	5	3

Using Commas = 914, 065, 453

Number name = Nine hundred fourteen million, sixty-five thousand four hundred fifty three.

(f) International Place Value Chart

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	5	0	9	6	8	3	0	2

Using Commas = 50, 968, 302

Number name = Fifty million, nine hundred sixty-eight thousand, three hundred two.

2. (a)

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	6	0	0	4	4	0	6	4

Ans = 60, 044, 064

(b)

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
3	0	1	0	0	2	0	3	1

Ans = 301, 002, 031

(c)

Millions			Thousands			Ones		
H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	1	9	0	0	0	0	1	9

Ans = 19, 000, 019

(d)	Millions			Thousands			Ones		
	H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	2	8	9	0	6	9	0	4	8

Ans = 289, 069, 048

3. (a)

(a)	Millions			Thousands			Ones		
	H-M	T-M	M	H-Th	T-Th	Th	H	T	O
		3	9	0	0	7	5	2	8

Place value of 7 = 7000

(b)

(b)	Millions			Thousands			Ones		
	H-M	T-M	M	H-Th	T-Th	Th	H	T	O
	5	6	7	2	0	1	2	0	8

Place value of 7 = 7000000

(c)

(c)	Millions			Thousands			Ones		
	H-M	T-M	M	H-Th	T-Th	Th	H	T	O
		7	1	3	2	4	1	6	3

Place value of 7 = 70000000

- 4. (a)** $60084321 = 60000000 + 80000 + 4000 + 300 + 20 + 100$
(b) $23146208 = 20000000 + 3000000 + 100000 + 6000 + 200 + 8$
(c) $509312784 = 500000000 + 9000000 + 300000 + 10000 + 2000 + 700 + 80 + 4$
(d) $93720500 = 90000000 + 3000000 + 700000 + 20000 + 500$

Exercise 1.4

1. Population of city A = 2, 63, 498
 Number of people migrate to city A = 4,32,000
 Number of people migrate from city A = 1, 32,462
 Current population of city A = 2,63,498 + 4,32,000 – 1,32,462

Step 1

$$\begin{array}{r} 2, 63, 498 \\ + 4, 32, 000 \\ \hline \underline{6, 95, 498} \end{array}$$

Step 2

$$\begin{array}{r} 6, 95, 498 \\ - 1, 32, 462 \\ \hline \underline{5, 63, 036} \end{array}$$

Thus, current population of city A was 5,63,036

2. Number of scooters produced in first year = 9295715

Number of scooters produced in second year = 9295715 + 798634

Thus, 10094347 scooters were produced in second year.

Total number of scooters produced in both the years

$$= 9295715 + 10094349$$

$$\begin{array}{r} 9295715 \\ + 798634 \\ \hline 10094349 \\ 9295715 \\ + 10094349 \\ \hline 19390064 \end{array}$$

Thus, 19390064 scooters were produced in both the years

3. $A \xleftarrow{42 \text{ km } 875 \text{ m}} \xrightarrow{B}$

Distance covered in one trip from A to B = 42 km 875 m

Number of trips = 6

Distance covered in one day = 42 km 875 m \times 6 = 257 km 250 m

Number of days in the month of May = 30

Distance covered in the month of May = 30 \times 257 km 250 m

$$= 7717 \text{ km } 500 \text{ m}$$

4. Smallest 7-digit number formed by using 2,0,3,1 and 5 is

T-L	L	T-Th	Th	H	T	O
1	0	0	0	2	3	5

According to question

$$1000235 \div 819$$

$$Q = 1221; R = 236$$

Thus, remainder is 236.

$$\begin{array}{r} 819 \overline{)1000235} \overline{)1221} \\ \underline{-819} \\ 1812 \\ \underline{-1638} \\ 1743 \\ \underline{-1638} \\ 1055 \\ \underline{-819} \\ 236 \end{array}$$

5. Three years ago population of town was = 3502914

Current population of town = 4857346

Increase in population in last 3 years = 4857346 - 3502914

$$\begin{array}{r} \text{TL} \quad \text{L} \quad \text{T-Th} \quad \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 4 \quad 8 \quad 5 \quad 7^6 \quad 3^{13} \quad 4 \quad 6 \\ - \quad 3 \quad 5 \quad 0 \quad 2 \quad 9 \quad 1 \quad 4 \\ \hline 1 \quad 3 \quad 5 \quad 4 \quad 4 \quad 3 \quad 2 \end{array}$$

Thus, 13,54,432 was the increase in population in last 3 years

6. Capacity of a jar = 6l 500 ml = 6500ml

Capacity of a bowl = 1l 300ml = 1300ml

Number of bowls = 6500 \div 1300

Thus, 5 bowls were required to fill the jar.

$$\begin{array}{r} 1300 \overline{)6500} \overline{)5} \\ \underline{-6500} \\ 0 \end{array}$$

7. Capacity of a tank = 9751 800 ml = 975800 ml
 Capacity of jug = 31 500 ml = 3500 ml
 Number of jugs = $975800 \div 3500$
- $$\begin{array}{r}
 3500 \overline{)975800} \quad 278 \\
 \underline{-7000} \quad \downarrow \\
 27580 \\
 \underline{-24500} \quad \downarrow \\
 30800 \\
 \underline{-28000} \\
 \hline
 2800
 \end{array}$$
- Thus, 278 maximum number of jugs were required.
8. Wrong multiplication = $5684 \times 98 = 557032$
 Correct multiplication = $5684 \times 89 = 505876$
 Difference in answer = $557032 - 505876 = 51156$

9. Total votes received by 4 candidates
 $= -268970 + 995765 + 776531 + 829314 = 2870580$
 Number of invalid votes = 75896
 Number of people did not vote = 43106
 Total number of votes registered
 $= 2870580 + 75896 + 43106 = 2989582$ votes

Thus, 29,89,582 votes were registered .

10. cost of one sofa set = ₹ 36980
 cost of 1746 sofa sets = ₹ $36980 \times 1746 = ₹ 64567080$
 Thus ₹ 64,567,080 was the cost of 1746 sofa sets.

11. Amount contributed by one student = ₹ 500
 Number of students = 2786

$$\begin{array}{r}
 \text{Total money contributed} = ₹ 500 \times 2786 = ₹ 1393000 \\
 \begin{array}{r}
 11980 \\
 \times 12 \\
 \hline
 23960 \\
 11980 \times \\
 \hline
 143760
 \end{array}
 \end{array}$$

Thus, ₹ 1393000 was the total money contributed

12. Number of pages in one newspaper = 12
 Number of newspaper copies = 11980

Total number of pages printed everyday = 12×11980

Thus, 143760 pages were printed everyday

13. Mass of a brick = 3 kg 250 g = 3250 g
 Total mass of 14 bricks = 3250×14

Thus, 45 kg, 500 g was the total mass of 174 brick.

14. Product of two numbers = 6498844
 first number = 1397
 Second number = $6498844 \div 1397$
 Thus, 4652 was the second number.

$$\begin{array}{r}
 1397 \overline{)6498844} \quad 4652 \\
 \underline{-5588} \quad \downarrow \\
 9108 \\
 \underline{-8382} \quad \downarrow \\
 7284 \\
 \underline{-6985} \quad \downarrow \\
 2794 \\
 \underline{-2794} \\
 \hline
 0
 \end{array}$$

15. Number of packets = 8

Total mass of 8 packets = 10 kg 600 g = 10600 g

Mass of each packet = $10600 \div 8$

Thus, 1 kg 325 g was the mass of each packet

$$\begin{array}{r} 8 \overline{)10600} 1325 \\ \underline{-8} \\ 26 \\ \underline{-24} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Exercise 1.5

1. (a) 2456

Round off to the nearest ten 2456 \rightarrow 2460

(b) 821

Round off to the nearest ten 821 \rightarrow 820

(c) 38

Round off to the nearest ten 38 \rightarrow 40

(d) 12

Round off to the nearest ten 12 \rightarrow 10

2. (a) 111

Round off to the nearest hundred 111 \rightarrow 100

(b) 1052

Round off to the nearest hundred 1052 \rightarrow 1100

(c) 692

Round off to the nearest hundred 692 \rightarrow 700

(e) 51263

Round off to the nearest hundred 51263 \rightarrow 51300

3 (a) 1265

Round off to the nearest thousands 81265 \rightarrow 81000

(b) 3210

Round off to nearest thousands 3210 \rightarrow 3000

(c) 91867

Round off to nearest thousands 91867 \rightarrow 92000

(d) 2051

Round off to nearest thousands 2051 \rightarrow 2000

4. (a) $673 + 435$

Round off both the number to nearest hundreds.

$673 \rightarrow 700$; $700 + 400 = 1100$

(b) $5290 + 17986$

Round off both the number to nearest thousand

$$5290 \rightarrow 5000; 17986 \rightarrow 18000; 5000 + 18000 = 23000$$

(c) $4238 + 6509$

Rounds off both number to nearest thousands

$$4238 \rightarrow 4000; 6509 \rightarrow 7000; 4000 + 7000 = 11000$$

(d) $109325 + 83780$

Round off both the numbers to nearest ten thousand

$$109325 = 110000; 83780 \rightarrow 80000; 110000 + 80000 = 190000$$

5. (a) $112935 - 39806$

Rounds off to nearest the thousand

$$110000 - 40000 = 70000$$

(b) $5365 - 2830$

Round off to nearest thousand

$$5365 \rightarrow 5000; 2830 \rightarrow 3000; 5000 - 3000 = 2000$$

(c) $567 - 436$

Round off to nearest hundred

$$5673 \rightarrow 5700; 436 \rightarrow 400; 5700 - 400 = 5300$$

(d) $89 - 32$

Round off to nearest ten

$$89 \rightarrow 90; 32 \rightarrow 30; 90 - 30 = 60$$

6. (a) 525×78

Round off both number to nearest ten

$$525 \rightarrow 530; 78 \rightarrow 80; 530 \times 80 = +42400$$

(b) 42×195

round off both number to nearest ten

$$42 \rightarrow 40; 195 \rightarrow 200; 200 \times 40 = 8000$$

(c) 4395×7

Round off both number to nearest ten

$$4395 \rightarrow 4400; 7 \rightarrow 10; 4400 \times 10 = 44000$$

(d) 293×426

Round off both number to nearest hundreds

$$293 \rightarrow 300; 426 \rightarrow 400; 300 \times 400 = 120000$$

(e) 859×378
Round off to nearest hundreds.
 $859 \rightarrow 900$; $378 \rightarrow 400$; $900 \times 400 = 360000$

(f) 5×683
Round off to nearest ten
 $5 \rightarrow 10$; $683 \rightarrow 680$; $680 \times 10 = 6800$

7. (a) $72 \div 7$
Round off to nearest ten
 $72 \rightarrow 70$; $7 \rightarrow 10$; $70 \div 10 = 7$

(b) $8706 \div 293$
Round off to nearest hundred
 $8706 \rightarrow 8700$; $293 \rightarrow 300$; $8700 \div 300 = 29$

(c) $235 \div 16$
Round off to nearest ten
 $235 \rightarrow 240$; $16 \rightarrow 20$; $240 \div 20 = 12$

(d) $939 \div 36$
round off to nearest ten
 $939 \rightarrow 940$; $36 \rightarrow 40$; $940 \div 40 = 23.5$

(e) $1623 \div 173$
Round off to nearest hundred
 $1623 \rightarrow 1600$; $173 \rightarrow 200$; $1600 \div 200 = 8$

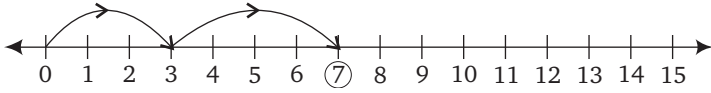
(f) $82 \div 18$
Round off to nearest ten
 $82 \rightarrow 80$; $18 \rightarrow 20$; $80 \div 20 = 4$

Exercises 1.6

1. (a) 76- LXXVI (b) 139 \rightarrow CXXXIX (c) 173 \rightarrow CLXXIII
(d) 201 \rightarrow CCI (e) 245 \rightarrow CCXLV (f) 289 \rightarrow CCLXXXIX
(g) 305 \rightarrow CCCV (h) 336 \rightarrow CCCXXXVI
2. (a) (ii) (b) (iii) (c) (iv) (d) (i)
3. (a) LV= 55 (b) LXIV = 64 (c) XCI= 91 (d) CCLXI = 261
(e) CLIX= 159 (f) CCCXLIV= 344 (g) CDXVI= 416
(h) CCLXXXIII= 283 (i) CCCLXIV= 364 (j) CDXXXIX = 439

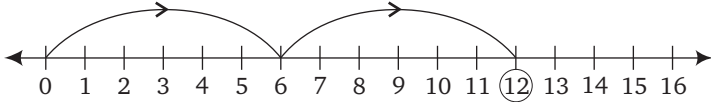
Exercise 2.1

1. (a) $3 + 4$



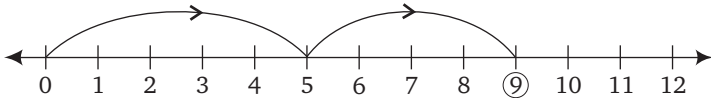
$$3 + 4 = 7$$

(b) $6 + 6$



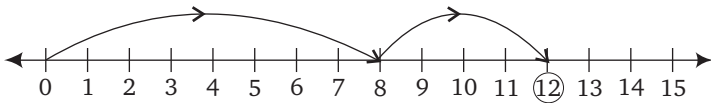
$$6 + 6 = 12$$

(c) $5 + 4$



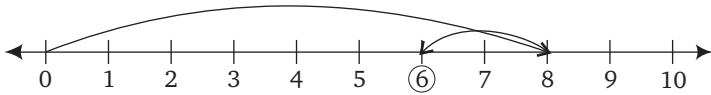
$$5 + 4 = 9$$

(d) $8 + 4$



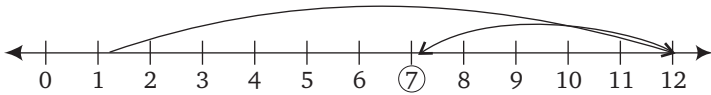
$$8 + 4 = 12$$

2. (a) $8 - 2$



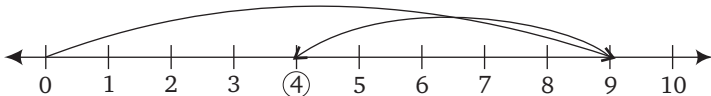
$$8 - 2 = 6$$

(b) $12 - 5$



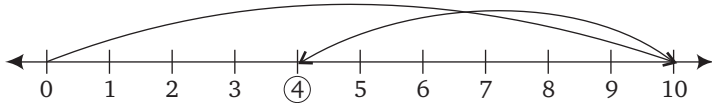
$$12 - 5 = 7$$

(c) $9 - 5$



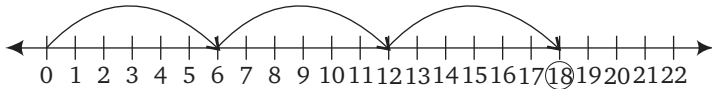
$$9 - 5 = 4$$

(d) $10 - 6$



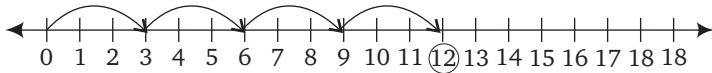
$$10 - 6 = 4$$

3. (a) 6×3



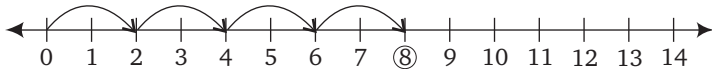
$$6 \times 3 = 18$$

(b) 3×4



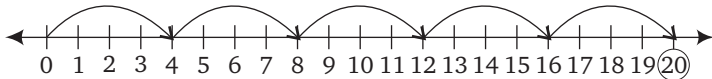
$$3 \times 4 = 12$$

(c) 2×4



$$2 \times 4 = 8$$

(d) 4×5



$$4 \times 5 = 20$$

Exercise 2.2

- (a) True (b) True (c) False (d) True
- (a) $x = 9$ (Associative Property)
(b) $x = 8$ (Associative property)
- (a) $(273 + 627) + (512 + 388) = 900 + 900 = 1800$
(b) $(265 + 308) + 198 = 573 + 198 = 771$
- (a) $4 * 5 = 2 \times 4 + 3 \times 5 = 8 + 15 = 23$
 $0 * 20 = 2 \times 0 + 3 \times 20 = 0 + 60 = 60$
(b) $4 * 5 = 2 \times 4 + 3 \times 5 = 8 + 15 = 23$
 $5 * 4 = 2 \times 5 + 3 \times 4 = 10 + 12 = 22$
 $23 \neq 20$ No, it is not equal.

5. (a) True (b) True (c) False
 6. (a) 222 (b) 1146 (c) 0 (d) 107

Exercise 2.3

- (a) $25 - (13 - 11) = (25 - 13) - 11$
 $25 - 2 = 12 - 11$
 $23 = 1$ (false)
- (b) $87 - 99 = -12$ (false)
- (c) True
- (d) True (Property of zero)
2. (a) $10(28 - 18)$ (b) $32(96 - 64)$
3. (a) $x = 7(12 - 5)$ (b) $x = 40(48 - 8)$
4. (a) $(4 \times 25) \times 88 = 100 \times 88 = 8800$
 (b) $(4 \times 125) \times (80 \times 75) = 100 \times 6000 = 600000$
 (c) $(2 \times 50) \times 192 = 100 \times 192 = 19200$
 (d) $(8 \times 125) \times 73 = 1000 \times 73 = 73000$
5. (a) 600 (b) 0
6. (a) $65 \times 55 + 25 \times 65 = 65 \times (55 + 25)$ (Distributive Property)
 $= 65 \times 80 = 5200$
- (b) $64 \times 331 + 64 \times 169 = 64 \times (331 + 169)$ (Distributive Property)
 $= 64 \times 500 = 32000$
- (c) $450 \times 592 - 45 \times 10 + 492 = 450 \times 592 - 450 + 492$
 $= 450 \times (592 - 492)$ (Distributive Property)
 $= 450 \times 100 = 45000$
- (d) $735 \times 95 = (700 + 35) \times 95$ (Distributive Property)
 $= 700 \times 95 + 35 \times 95 = 66500 + 3325 = 69825$
- (e) $144 \times 87 = (100 + 44) \times 87$ (Distributive Property)
 $= 87 \times 100 + 44 \times 87 = 8700 + 3828 = 12528$
7. Cost of one chair = ₹ 414
 Cost of one table = ₹ 1225
 cost of 50 chairs = $50 \times ₹ 415$
 cost of 50 tables = $50 \times ₹ 1225$
 Total money spent = $50 \times ₹ 415 + 50 \times ₹ 1225$
 $= ₹ 50 \times (415 + 1225) = ₹ 50 \times 1640 = ₹ 82000$

8. Cost of one pen = ₹ 34

Cost of one ball pen = ₹ 16

Cost of 12 pens = ₹ 12 × 34

Cost of 12 ball pens = ₹ 12 × 16

Total money spend = ₹ 12 × 34 + 12 × 16

$$= ₹ 12 \times (34 + 16) = ₹ 12 \times 50 = ₹ 600$$

9. (a) $21 * 30 = (21 + 5) \times (2 \times 30) = 26 \times 60 = 1560$

$$0 * 37 = 0 + 5 \times (2 \times 37) = 5 \times 74 = 370$$

(b) $6 * 3 = 3 * 6$

LHS

$$(6 + 5) \times (2 \times 3)$$

$$= 11 \times 6 = 66$$

LHS ≠ RHS

$$(3 + 5) \times (2 \times 6)$$

$$= 8 \times 12 = 96$$

10. Yes $p = 1$

i.e., $1 \times 1 = 1$

11. $a = 37$

$b = 3$

$$(a + b) \times (a - b) = (a \times a) - (b \times b)$$

$$(37 + 3) \times (37 - 3) = (37 \times 37) - (3 \times 3)$$

$$40 \times 3 = 1369 - 9; \quad 1360 = 1360$$

LHS = RHS

Hence Verified

12. Total population of a village = 10725

Number of uneducated people = $10725 \div 15 = 715$

Number of educated people = $10725 - 715 = 10010$

Exercise 24

1. (a) $1800 - 99 = 1800 - 100 + 1 = 1700 + 1 = 1701$

$$(b) \quad 8125 + 9999 = 8125 + 10000 = 18125 - 1 = 18124$$

$$(c) \quad 1739 \times 9999 = 1739 \times (1000 - 1) = 1739000 - 1739 = 17388261$$

$$(d) \quad 336 + 9999 = 336 + 1000 - 1 = 10336 - 1 = 10335$$

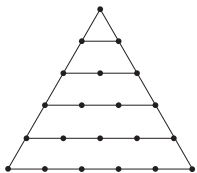
$$(e) \quad 62939 - 9999 = 62939 - 10000 + 1 = 52939 + 1 = 52940$$

$$(f) \quad 1736 + 9999 = 1736 + 10000 - 1 = 101736 - 1 = 101735$$

2. 11110, 11110

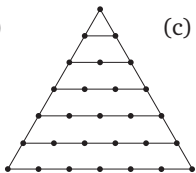
3. $89728972, 6509465094; 8972 \times (10000 + 1), 65094 \times (100000 + 1)$

4. (a)



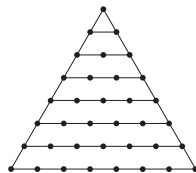
(21)

(b)



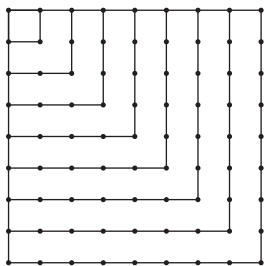
(28)

(c)

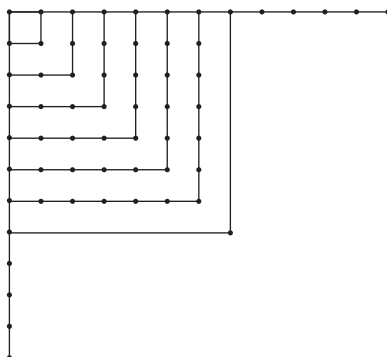


(36)

5. (a) $81 = (9)^2$



(b) $144 = 12^2$



(c) $12100 = (110)^2$

Exercise 3.1

1. (a) 9

$$1 \times 9 = 9; 3 \times 3 = 9$$

Thus, 1, 3, 9 are all factors

(b) 18

$$1 \times 18 = 18; 2 \times 9 = 18; 3 \times 6 = 18$$

Thus, 1, 2, 3, 6, 9, 18 are all factors

(c) 48

$$1 \times 48 = 48; 2 \times 24 = 48; 3 \times 16 = 48; 4 \times 12 = 48; 6 \times 8 = 48$$

Thus, 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48 are all factors

(d) 39

$$1 \times 39 = 39; 3 \times 13 = 39$$

Thus, 1, 3, 13, 39 are all factors

(e) 168

$$1 \times 168 = 168$$

$$6 \times 28 = 168$$

$$2 \times 84 = 168$$

$$7 \times 27 = 168$$

$$3 \times 56 = 168$$

$$8 \times 21 = 168$$

$$4 \times 42 = 168$$

$$12 \times 14 = 168$$

Thus, 1, 2, 3, 4, 6, 7, 8, 12, 14, 21, 24, 28, 42, 56, 84, 168 are all factors

(f) 47

$$1 \times 47 = 47$$

Thus, 1, 47 are all factors

(g) 256

$$1 \times 256 = 256; 2 \times 128 = 256; 4 \times 64 = 256;$$

$$8 \times 32 = 256; 16 \times 16 = 256$$

Thus, 1, 2, 4, 8, 16, 32, 64, 128, 256 are all factors.

(h) 441

$$1 \times 441 = 441; 3 \times 147 = 441; 7 \times 63 = 441$$

$$9 \times 49 = 441; 21 \times 21 = 441$$

Thus, 1, 3, 7, 9, 21, 49, 63, 147, 441 are all factors

(i) 986

$$1 \times 986 = 986; 2 \times 493 = 986; 17 \times 58 = 986; 34 \times 29 = 986$$

Thus, 1, 2, 17, 29, 58, 986 are all factors

(j) 729

$$1 \times 729 = 729; 3 \times 243 = 729; 9 \times 81 = 729; 27 \times 27 = 729$$

Thus, 1, 3, 9, 27, 81, 243, 729 are all factors

(k) 545

$$1 \times 545 = 545; 5 \times 109 = 545$$

Thus, 1, 5, 109, 545 are all factors

(l) 856

$$1 \times 856 = 856; 2 \times 428 = 856; 4 \times 214 = 856; 8 \times 107 = 856$$

Thus, 1, 2, 4, 8, 107, 214, 428, 856 are all factors.

2. 13962

$$13962 \div 39 = 358$$

$$\therefore 39 \times 358 = 13962$$

yes 39 is the factor of 13962.

3. yes, $53 \times 2367 = 125451$

4. (a) $6 \times 1 = 6$, $6 \times 2 = 12$, $6 \times 3 = 18$, $6 \times 4 = 24$,

$$6 \times 5 = 30, 6 \times 6 = 36$$

(b) $11 \times 1 = 11$, $11 \times 2 = 22$, $11 \times 3 = 33$, $11 \times 4 = 44$, $11 \times 5 = 55$,

$$11 \times 6 = 66,$$

(c) $19 \times 1 = 19$, $19 \times 2 = 38$, $19 \times 3 = 57$, $19 \times 4 = 76$,

$$19 \times 5 = 95, 19 \times 6 = 114$$

(d) $3 \times 1 = 3$, $3 \times 2 = 6$, $3 \times 3 = 9$, $3 \times 4 = 12$, $3 \times 5 = 15$, $3 \times 6 = 18$

(e) $21 \times 1 = 21$, $21 \times 2 = 42$, $21 \times 3 = 63$, $21 \times 4 = 84$,

$$21 \times 5 = 105, 21 \times 6 = 126$$

(f) $25 \times 1 = 25$

$$25 \times 2 = 50$$

$$25 \times 3 = 75$$

$$25 \times 4 = 100$$

$$25 \times 5 = 125$$

$$25 \times 6 = 150$$

(g) $57 \times 1 = 57$

$$57 \times 2 = 114$$

$$57 \times 3 = 171$$

$$57 \times 4 = 228$$

$$57 \times 5 = 285$$

$$57 \times 6 = 342$$

(h) $81 \times 1 = 81$

$$81 \times 2 = 162$$

$$81 \times 3 = 243$$

$$81 \times 4 = 324$$

$$81 \times 5 = 405$$

$$81 \times 6 = 486$$

(i) $93 \times 1 = 93$

$$93 \times 2 = 186$$

$$93 \times 3 = 279$$

$$93 \times 4 = 372$$

$$93 \times 5 = 465$$

$$93 \times 6 = 558$$

(j) $45 \times 1 = 45$

$$45 \times 2 = 90$$

$$45 \times 3 = 135$$

$$45 \times 4 = 180$$

$$45 \times 5 = 225$$

$$45 \times 6 = 270$$

(k) $86 \times 1 = 86$

$$86 \times 2 = 172$$

$$86 \times 3 = 258$$

$$86 \times 4 = 344$$

$$86 \times 5 = 430$$

$$86 \times 6 = 516$$

(l) $27 \times 1 = 27$

$$27 \times 2 = 54$$

$$27 \times 3 = 81$$

$$27 \times 4 = 108$$

$$27 \times 5 = 135$$

$$27 \times 6 = 162$$

5. (a) $81 \times 11 = 891$

(b) $7 \times 5 = 35$

$$7 \times 6 = 42; 7 \times 7 = 49; 7 \times 8 = 56$$

6. Prime numbers between 0 and 100 is

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71,
73, 79, 83, 89, 97,

There are 25 prime numbers.

7. Prime numbers = 13, 11, 97, 3, 61, 187.
8. (a) and (c) because they have only one number in between.
9. (a) true (b) false (c) True (d) true (e) False (f) True
10. $4 = 1, 2, 4$ are factors; $21 = 1, 3, 7$ are factors
 $18 = 1, 2, 3, 9$ are factors; $93 = 1, 3, 31$ are factors
 So, composite numbers are 4, 21, 18, 93.

Exercise 3.2

1. (a) 216 6 at units place is divisible by 2
 (b) 9926 6 at units place is divisible by 2.
 (c) 243 3 at units place is not divisible by 3.
 (d) 10328 8 at units place is divisible by 2.
 (e) 5818 8 at units place is divisible by 2.
 (f) 921 1 at units place is not divisible is 2.
 so, a, b, d, e are divisible by 2.
2. (a) 72 is divisible by 4 because last two digits is divisible by 4.
 (b) 435915 The last 2-digits is not divisible by so number is not divisible by 4.
 (c) 228524 The last 2-digit is divisible by 4 so number is divisible by 4.
 (d) 43972 The last 2-digit is divisible by 4 so the number is divisible by 4.
 (e) 7141 the last 2-digit is not divisible by 4 so the number is not divisible by 4.
 (f) 1380 29 The last 2-digit number is not divisible by 4 so number is divisible by 4.
 Thus, (a, c, d) are divisible by 4.
3. (a) 21335 \rightarrow 5 is at units place so the no. is divisible by 5.
 (b) 37723 \rightarrow Units place is not divisible by 5.
 (c) 6105 \rightarrow 5 is at units place so the no. is divisible by 5.
 (d) 34300 \rightarrow 0 is at units place so the no. is divisible by 5.
 (e) 5005 \rightarrow 5 is at units place so the no. is divisible by 5.
4. (a) $4371 = 4 + 3 + 7 + 1 = 15$ is divisible by 3 So, the number is divisible by 3.
 (b) $60902 = 6 + 0 + 9 + 0 + 2 = 17$, it is not divisible by 3 so the number is not divisible by 3 or 9.
 (c) $64240 = 6 + 4 + 2 + 4 + 0 = 16$, it is not divisible by 3 so the number is not divisible by 3.

(d) $35433 = 3 + 5 + 4 + 3 + 3 = 18$, it is divisible by 3 so the number is divisible by 3 or 9.

(e) $50391 = 5 + 0 + 3 + 9 + 1 = 18$, it is divisible by 3 so the number is divisible by 3 or 9.

5. (a) 32642

32642 the digit at unit's place is even which is divisibly by 2 so the number is divisible by 2

$3 + 2 + 6 + 4 + 2 = 17$ the sum of the digits is not divisible by 3,

Therefore 32642 is not divisible by 6.

(b) 36663

36663 - The digit at unit's place is not even so it is not divisible by 2, therefore the number is not divisible by 2.

$3 + 6 + 6 + 6 + 3 = 24$ the sum is divisible by 3, therefore the number is divisible by 3.

Therefore 36663 is not divisible by 6.

(c) 8135

8135 The digit at units place is not divisible by 2 so the number is not divisible by 2 $8 + 1 + 3 + 5 = 17$, the sum is not divisible by 3, therefore it is not divisible by 3.

Therefore 8135 is not divisible by 6.

(d) 99864

99864 - The digit at units place is even so the number is divisible by 2.

$9 + 9 + 8 + 6 + 4 = 36 = 3 + 6 = 9$, the sum is divisible by 3, therefore the number is divisible by 3

There 99864 is divisible by 6.

(e) 4314

4314 - The digit at units place is even, so the number is divisible by 2.

$4 + 3 + 1 + 4 = 12 = 1 + 2 = 3$, the sum is divisible by 3 so the number is divisible by 3.

So the number is divisible by 3.

Therefore 4314 is divisible by 6.

(f) 6981

6981- The digit at units place is not even so it is not divisible by 2.

$6 + 9 + 8 + 1 = 24 = 2 + 4 = 6$, the sum is divisible by 3, so the number is divisible by 3.

Therefore, the number is not divisible by 6.

6. (a) $568 = 56 - (2 \times 8) = 56 - 16 = 40$
Since 40 is not divisible by 7
Therefore 568 is not divisible by 7
- (b) $3087 = 308 - (2 \times 7) = 308 - 14 = 294$
Since 294 is divisible by 7
Therefore 3087 is divisible by 7.
- (c) $4578 = 457 - (2 \times 8) = 457 - 16 = 441$
Since 441 is divisible by 7
Therefore 4578 is divisible by 7
- (d) $69111 = 6911 - (2 \times 1) = 6911 - 2 = 6909$
Since 6909 is divisible by 7
Therefore 69111 is divisible by 7.
- (e) $343 = 34 - (2 \times 3) = 34 - 6 = 28$
Since 28 is divisible by 7
Therefore 343 is divisible by 7
- (f) $2557 = 255 - (2 \times 7) = 255 - 14 = 241$
Since 241 is not divisible by 7
Therefore 2557 is not divisible by 7.
7. (a) 16777216
216 is divisible by 8
Therefore 16777216 is divisible by 8
- (b) 8931
931 is not divisible by 8
Therefore 8931 is not divisible by 8.
- (c) 6273
273 is not divisible by 8
Therefore 6273 is not divisible by 8
- (d) 132126
126 is not divisible by 8
Therefore 132126 is not divisible by 8
- (e) 86881
881 is not divisible by 8.
Therefore 86881 is not divisible by 8.

(f) $33000 = 000$ is divisible by 7.
Therefore 33000 is not divisible by 7.

8. (a) 769483

Sum of odd places = $7 + 9 + 8 = 24$

Sum of even places = $6 + 4 + 3 = 13$

Difference = $24 - 13 = 11$

Hence 769483 is divisible by 11

(b) 15350

Sum of odd places = $1 + 3 + 0 = 4$

Sum of even places = $5 + 5 = 10$

Difference = $10 - 4 = 6$

Hence 15350 is not divisible by 11

(c) 14909

Sum of odd places = $1 + 9 + 9 = 19$

Sum of even places = $4 + 0 = 4$

Difference = $19 - 4 = 15$

Hence 14909 is not divisible by 11

(d) 3784

Sum of odd places = $3 + 8 = 11$

Sum of even places = $7 + 4 = 11$

Difference = $11 - 11 = 0$

Hence 3789 is divisible by 11.

(e) 61831

Sum of odd places = $6 + 8 + 1 = 15$

Sum of even places = $1 + 3 = 4$

Difference = $15 - 4 = 11$

hence 61831 is divisible by 11

9. (a) 10 (b) 15 (c) 6

10. 137, 139, 167, 163, 323, 101, 133, 391

Exercise 3.3

1. 66

2	66
3	33
11	11
	1

$$66 = 2 \times 3 \times 11$$

2. 52

2	66
3	33
11	11
	1

$$34 = 2 \times 17$$

3. 52

2	52
3	26
13	13
	1

$$52 = 2 \times 2 \times 13$$

4. 72

2	72
2	36
2	18
3	9
3	3
	1

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

5. 390

3	390
13	130
2	10
5	5
	1

$$390 = 2 \times 3 \times 5 \times 13$$

6. 216

2	216
2	108
2	54
3	27
3	9
3	3
	1

$$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

7. 468

2	468
2	234
3	117
3	39
13	13
	1

$$468 = 2 \times 2 \times 3 \times 3 \times 13$$

8. 540

2	540
2	270
5	135
3	27
3	9
3	3
	1

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

9. 9000

3	9000
3	3000
2	1000
2	500
2	250
5	125
5	25
5	5
	1

$$9000 = 3 \times 3 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5$$

10. 3125

$$3125 = 5 \times 5 \times 5 \times 5 \times 5$$

5	3125
5	625
5	125
5	25
5	5
	1

11. 1729

$$1729 = 7 \times 13 \times 19$$

7	1729
13	247
19	19
3	1
	1

12. 8790

$$\begin{array}{r|l}
 2 & 8790 \\
 \hline
 5 & 4395 \\
 \hline
 3 & 879 \\
 \hline
 293 & 293 \\
 \hline
 & 1
 \end{array}$$

$$8790 = 2 \times 5 \times 3 \times 293$$

14. 475

$$\begin{array}{r|l}
 5 & 475 \\
 \hline
 5 & 95 \\
 \hline
 19 & 19 \\
 \hline
 & 1
 \end{array}$$

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

16. 100

$$\begin{array}{r|l}
 2 & 100 \\
 \hline
 2 & 50 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 & 1
 \end{array}$$

$$100 = 2 \times 2 \times 5 \times 5$$

18. 48

$$\begin{array}{r|l}
 2 & 48 \\
 \hline
 2 & 24 \\
 \hline
 2 & 12 \\
 \hline
 3 & 6 \\
 \hline
 3 & 3 \\
 \hline
 3 & 1
 \end{array}$$

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

13. 152

$$\begin{array}{r|l}
 2 & 152 \\
 \hline
 2 & 76 \\
 \hline
 2 & 38 \\
 \hline
 19 & 19 \\
 \hline
 & 1
 \end{array}$$

$$152 = 2 \times 2 \times 2 \times 19$$

15. 1260

$$\begin{array}{r|l}
 2 & 1260 \\
 \hline
 2 & 630 \\
 \hline
 5 & 315 \\
 \hline
 3 & 63 \\
 \hline
 3 & 21 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$1260 = 2 \times 2 \times 5 \times 3 \times 3 \times 7$$

17. 1512

$$\begin{array}{r|l}
 2 & 1512 \\
 \hline
 2 & 756 \\
 \hline
 2 & 378 \\
 \hline
 3 & 189 \\
 \hline
 3 & 63 \\
 \hline
 3 & 21 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$1512 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7$$

19. 20570

$$\begin{array}{r|l}
 2 & 20570 \\
 \hline
 2 & 4114 \\
 \hline
 5 & 2057 \\
 \hline
 5 & 187 \\
 \hline
 17 & 17 \\
 \hline
 & 1
 \end{array}$$

$$20570 = 5 \times 2 \times$$

$$11 \times 11 \times 17$$

20. 1790

5	1790
2	358
179	179
5	1
	1

$$1790 = 5 \times 2 \times 179$$

22. 9962

2	9962
17	4981
293	293
	1

$$9962 = 2 \times 17 \times 293$$

24. 2907

3	2907
3	969
17	323
19	19
	1

$$2907 = 3 \times 3 \times 17 \times 19$$

21. 4641

3	4641
7	1547
11	221
13	13
	1

$$4641 = 3 \times 7 \times 17 \times 13$$

23. 3525

5	3525
5	705
3	141
47	47
	1

$$3525 = 5 \times 5 \times 3 \times 47$$

Exercise 4.1

1. (a) 68,96

Factors

$1 \times 68 = 68; 1 \times 96 = 96$

$2 \times 34 = 68; 2 \times 48 = 96$

$4 \times 17 = 68; 3 \times 32 = 96; 4 \times 24 = 96$

Common Factors = 1, 2, 4

(b) 96,228

Factors

$1 \times 96 = 96; 2 \times 48 = 96;$

$1 \times 228 = 228; 2 \times 114 = 228$

$3 \times 32 = 96; 4 \times 24 = 96;$

$3 \times 76 = 228; 4 \times 57 = 228$

$6 \times 16 = 96; 12 \times 8 = 96;$

$6 \times 38 = 228; 12 \times 19 = 228$

Common factors = 1, 2, 3, 4, 6, 12

(c) 102, 206

Factors

$$1 \times 102 = 102; 2 \times 51 = 102; 3 \times 34 = 102$$

$$\text{Common Factors} = 1, 2$$

2. (a) 24, 72

$$24 = 2 \times 2 \times 2 \times 3; 72 = 2 \times 2 \times 2 \times 3 \times 3$$

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

1. (d) 170, 238

Factors

$$1 \times 170 = 170; 2 \times 85 = 170; 5 \times 34 = 170; 17 \times 10 = 170$$

$$1 \times 238 = 238; 2 \times 119 = 238; 17 \times 14 = 238; 7 \times 34 = 238$$

$$\text{Common factors} = 1, 2, 17, 34$$

(e) 66, 64

Factors

$$1 \times 66 = 66$$

$$1 \times 64 = 64$$

$$2 \times 33 = 66$$

$$2 \times 32 = 64$$

$$3 \times 22 = 66$$

$$4 \times 16 = 64$$

$$6 \times 11 = 66$$

$$\text{Common factors} = 1, 2$$

(f) 36, 72

Factors

$$1 \times 36 = 36$$

$$1 \times 72 = 72$$

$$2 \times 18 = 36$$

$$2 \times 36 = 72$$

$$3 \times 12 = 36$$

$$3 \times 24 = 72$$

$$4 \times 9 = 36$$

$$4 \times 18 = 72$$

$$6 \times 6 = 36$$

$$6 \times 12 = 72$$

$$8 \times 9 = 72$$

$$\text{Common Factors} = 1, 2, 3, 4, 6, 9, 12, 18, 36$$

2. (b) 34, 102

$$34 = 2 \times 17;$$

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

$$\text{HCF} = 2 \times 17 = 34$$

2	24	2	72
2	12	2	36
2	6	2	18
3	3	3	9
	1	3	3
			1

2	34
17	17
	1

(c) 1024, 512, 2048

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

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

2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$$1024 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$2048 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

(e) 18, 48, 432

2	18
2	9
2	3
	1

2	48
2	24
2	12
2	6
2	3
	1

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

$$18 = 2 \times 3 \times 3; 48 = 2 \times 2 \times 2 \times 2 \times 3;$$

$$432 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

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

(e) 256, 512, 216

$$256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

$$\text{HCF} = 2 \times 2 \times 2 = 8$$

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

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

2	216
2	108
2	54
3	27
3	9
3	3
	1

(f) 64, 24, 96

2	64
2	32
2	16
2	8
2	4
2	2
	1

2	24
2	12
2	6
2	3
	1

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

$$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$24 = 2 \times 2 \times 2 \times 3$$

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

$$\text{HCF} = 2 \times 2 \times 2 = 8$$

3. (a) 84, 98

2	84
2	42
2	21
2	7
	1

2	98
2	49
2	7
	1

$$84 = 2 \times 2 \times 3 \times 7; 98 = 2 \times 7 \times 7$$

$$\text{HCF} = 2 \times 7 = 14$$

(b) 34, 102

$$34 = 2 \times 17; 102 = 2 \times 3 \times 17$$

2	34
17	17
	1

2	102
3	51
17	17
	1

$$\text{HCF} = 2 \times 17 = 34$$

(c) 1197, 5320, 4389

$$\begin{array}{r|l} 3 & 1197 \\ \hline 3 & 399 \\ \hline 133 & 133 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 5320 \\ \hline 2 & 2660 \\ \hline 2 & 13330 \\ \hline 5 & 665 \\ \hline 133 & 133 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 3 & 4389 \\ \hline 7 & 1463 \\ \hline & 209 \end{array}$$

$$\text{HCF} = 133$$

(d) 72, 108, 180

$$\begin{array}{r|l} 2 & 72 \\ \hline 2 & 36 \\ \hline 2 & 18 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 180 \\ \hline 2 & 90 \\ \hline 5 & 45 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

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

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

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

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

(e) 256, 512, 216

$$\begin{array}{r|l} 2 & 256 \\ \hline 2 & 128 \\ \hline 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 512 \\ \hline 2 & 256 \\ \hline 2 & 128 \\ \hline 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

$$\text{HCF} = 2 \times 2 \times 2 = 8$$

(f) 84, 120, 138

2	84
2	42
3	21
7	7
1	

2	120
2	60
2	30
3	15
5	5
1	

2	138
2	69
5	23
1	

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

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

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

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

(g) 240, 135

$$240 = 2 \times 2 \times 2 \times 2 \times 3 \times 5$$

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

$$\text{HCF} = 3 \times 5 = 15$$

2	240	5	135
2	120	3	27
2	60	3	9
2	30	3	3
3	15	1	
5	5		
1			

(h) 144, 252, 630

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
5	315
3	63
3	21
7	7
1	

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

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

$$\text{HCF} = 2 \times 3 \times 3 = 18$$

(i) 504, 980

$$504 = 2 \times 2 \times 2 \times 3 \times 3 \times 7$$

$$980 = 2 \times 7 \times 7 \times 2 \times 5$$

$$\text{HCF} = 2 \times 2 \times 7 = 4 \times 7 = 28$$

2	504	2	980
2	252	7	490
2	126	7	70
3	63	2	10
3	21	5	5
7	7	1	
1			

4. (a) $58 \overline{)70} (1$

$$\begin{array}{r} \underline{58} \\ 12 \overline{)58} (4 \\ \underline{48} \\ 10 \overline{)12} (1 \\ \underline{10} \\ 2 \overline{)10} (5 \\ \underline{10} \\ 0 \end{array}$$

HCF = 2

(b) $325 \overline{)525} (1$

$$\begin{array}{r} \underline{-325} \\ 200 \overline{)325} (1 \\ \underline{-200} \\ 125 \overline{)200} (1 \\ \underline{-125} \\ 75 \overline{)125} (1 \\ \underline{-75} \\ 50 \overline{)75} (1 \\ \underline{-50} \\ 25 \overline{)50} (2 \\ \underline{-50} \\ 0 \end{array}$$

HCF = 25

(c) 1794, 2346, 4761

$$\begin{array}{r} 1794 \overline{)2346} (1 \\ \underline{-1794} \\ 552 \overline{)1794} (3 \\ \underline{-1656} \\ 138 \overline{)552} (4 \\ \underline{-552} \\ 0 \end{array}$$

$$\begin{array}{r} 138 \overline{)4761} (34 \\ \underline{-414} \\ 621 \\ \underline{-552} \\ 69 \overline{)138} (2 \\ \underline{-138} \\ 0 \end{array}$$

HCF = 69

(d) 1850, 2736

$$\begin{array}{r} 1850 \overline{)2736} (1 \\ \underline{-1850} \\ 886 \overline{)1850} (2 \\ \underline{-1772} \\ 78 \overline{)886} (1 \\ \underline{-78} \\ 28 \overline{)78} (1 \\ \underline{-56} \\ 22 \overline{)28} (1 \\ \underline{-22} \\ 6 \overline{)22} (3 \\ \underline{-18} \\ 4 \overline{)6} (1 \\ \underline{-4} \\ 2 \overline{)4} (2 \\ \underline{-4} \\ 0 \end{array}$$

HCF = 2

- (e) 2241, 2324 (f) 1045, 1520

$$\begin{array}{r} 2241 \overline{)2324} (1 \\ -2241 \\ \hline 83 \overline{)2241} (27 \\ -166 \\ \hline 581 \\ -581 \\ \hline 0 \end{array}$$

HCF = 83

$$\begin{array}{r} 1045 \overline{)1520} (1 \\ -1045 \\ \hline 475 \overline{)1045} (2 \\ -950 \\ \hline 95 \overline{)475} (5 \\ -475 \\ \hline 0 \end{array}$$

HCF = 95

- (g) 658, 940, 1128

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

HCF = 94

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

- (h) 391, 425, 527

$$\begin{array}{r} 391 \overline{)425} (1 \\ -391 \\ \hline 34 \overline{)391} (11 \\ -34 \\ \hline 51 \\ -34 \\ \hline 17 \overline{)34} (3 \\ -34 \\ \hline 0 \end{array}$$

HCF = 17

- (j) 754, 1508, 1972

$$\begin{array}{r} 754 \overline{)1508} (2 \\ -1508 \\ \hline 0 \end{array} \quad \begin{array}{r} 754 \overline{)1972} (2 \\ -1508 \\ \hline 464 \overline{)754} (1 \\ -464 \\ \hline 290 \overline{)464} (1 \\ -290 \\ \hline 174 \overline{)290} (1 \\ -174 \\ \hline 116 \overline{)174} (1 \\ -116 \\ \hline 58 \overline{)116} (2 \\ -116 \\ \hline 0 \end{array}$$

HCF = 58

Exercise 4.2

1. (a) Multiples of 12 = 12, 24, 36, 48, 60
 Multiples of 36 = 36, 72, 108
 LCM = 36
- (b) Multiples of 12 = 12, 24, 36, 48, 60
 Multiples of 15 = 15, 30, 45, 60
 LCM = 60
- (c) Multiples of 4 = 4, 8, 12, 16, 20
 Multiples of 8 = 8, 16, 24, 40
 LCM = 8
- (d) Multiples of 10 = 10, 20, 30, 40, 50, 60
 Multiples of 12 = 12, 24, 36, 48, 60
 LCM = 60
- (e) Multiples of 6 = 6, 12, 18, 24, 30, 36, 48
 Multiples of 8 = 8, 16, 24, 40, 48
 LCM = 24
- (f) Multiples of 9 = 9, 18, 27, 36, 45
 Multiples of 12 = 12, 24, 36, 48, 60
 LCM = 36

2. (a) 72, 90

$\begin{array}{r l} 2 & 72, 90 \\ \hline 2 & 36, 45 \\ 9 & 18, 45 \\ 2 & 2, 5 \\ 5 & 1, 5 \\ \hline & 1, 1 \end{array}$	or	$\begin{array}{r l} 2 & 72 \\ \hline 2 & 36 \\ 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 3 & 90 \\ \hline 3 & 30 \\ 2 & 10 \\ 5 & 5 \\ \hline & 1 \end{array}$
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LCM = $2 \times 2 \times 9 \times 2 \times 5 = 360$

- (b) 14, 48, 24

$\begin{array}{r l} 2 & 14, 48, 24 \\ \hline 2 & 7, 24, 12 \\ 2 & 7, 12, 6 \\ 3 & 7, 6, 3 \\ 7 & 7, 2, 1 \\ 2 & 1, 2, 1 \\ \hline & 1, 1, 1 \end{array}$	or	$\begin{array}{r l} 2 & 14 \\ \hline 7 & 7 \\ & 1 \end{array}$	$\begin{array}{r l} 2 & 48 \\ \hline 2 & 24 \\ 2 & 12 \\ 2 & 6 \\ 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 2 & 24 \\ \hline 2 & 12 \\ 2 & 6 \\ 3 & 3 \\ & 1 \end{array}$
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LCM = $2 \times 2 \times 2 \times 3 \times 7 \times 2 = 336$

(c) 12, 48, 60

$$\begin{array}{r|l} 2 & 12, 48, 60 \\ \hline 2 & 1, 4, 5 \\ \hline 2 & 1, 2, 5 \\ \hline 5 & 1, 1, 5 \\ \hline & 1, 1, 1 \end{array} \quad \text{or} \quad \begin{array}{r|l} 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 48 \\ \hline 2 & 24 \\ \hline 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\text{LCM} = 12 \times 2 \times 2 \times 5 = 240$$

(d) 16, 30, 42

$$\begin{array}{r|l} 2 & 16, 30, 42 \\ \hline 3 & 8, 15, 21 \\ \hline 2 & 8, 5, 7 \\ \hline 2 & 2, 5, 7 \\ \hline 2 & 1, 5, 7 \\ \hline 5 & 1, 1, 7 \\ \hline 7 & 1, 1, 1 \end{array} \quad \text{or} \quad \begin{array}{r|l} 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 30 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 42 \\ \hline 3 & 21 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$16 = 2 \times 2 \times 2 \times 2$$

$$20 = 2 \times 3 \times 5$$

$$42 = 2 \times 3 \times 7$$

$$\text{LCM} = 2 \times 3 \times 2 \times 2 \times 2 \times 5 \times 7 = 1680$$

(e) 16, 18, 20

$$\begin{array}{r|l} 2 & 16, 18, 20 \\ \hline 2 & 8, 9, 10 \\ \hline 2 & 4, 9, 5 \\ \hline 2 & 2, 9, 5 \\ \hline 3 & 1, 9, 5 \\ \hline 3 & 1, 3, 5 \\ \hline 5 & 1, 1, 5 \\ \hline & 1, 1, 1 \end{array} \quad \text{or} \quad \begin{array}{r|l} 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 18 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 20 \\ \hline 2 & 10 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$16 = 2 \times 2 \times 2 \times 2$$

$$18 = 2 \times 3 \times 3; 20 = 2 \times 2 \times 5$$

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 720$$

(f) 62, 94

$$\begin{array}{r|l} 2 & 62, 94 \\ \hline 31 & 31, 47 \\ \hline 47 & 1, 47 \\ \hline & 1, 1 \end{array} \quad \text{or} \quad \begin{array}{r|l} 2 & 62 \\ \hline 31 & 31 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 94 \\ \hline 47 & 47 \\ \hline & 1 \end{array}$$

$$\text{LCM} = 3 \times 31 \times 47 = 2914$$

3. (a) 8, 12, 18, 24, 27

2	8, 12, 18, 24, 27
2	4, 6, 9, 12, 27
2	2, 3, 9, 6, 27
3	1, 3, 9, 3, 27
3	1, 1, 3, 1, 9
3	1, 1, 1, 1, 3
	1, 1, 1, 1, 1

(b) 600, 420, 240

2	660, 420, 240
10	330, 210, 120
3	33, 21, 12
7	11, 7, 4
11	11, 7, 4
4	1, 1, 4
	1, 1, 1

LCM = $2 \times 2 \times 2 \times 3 \times 3 \times 3 = 216$ LCM = $2 \times 10 \times 3 \times 7 \times 11 \times 4 = 18480$

(c) 144, 180, 384

2	144, 180, 384
2	72, 90, 192
4	36, 45, 96
9	9, 45, 274
2	1, 5, 24
2	1, 5, 12
5	1, 5, 6
2	1, 1, 6
3	1, 1, 3
	1, 1, 1

LCM = $2 \times 2 \times 4 \times 9 \times 2 \times 2 \times 5 \times 3 = 5760$

(d) 28, 36, 45, 60

2	28, 36, 45, 60
2	14, 18, 45, 30
3	7, 9, 45, 15
3	7, 3, 15, 5
5	7, 1, 5, 5
7	7, 1, 1, 1
	1, 1, 1, 1

(e) 108, 96, 72, 54, 36

2	108, 96, 72, 54, 36
2	54, 48, 36, 27, 18
2	27, 24, 18, 27, 9
3	27, 12, 9, 27, 9
3	9, 4, 3, 9, 3
3	3, 4, 1, 3, 1
4	1, 4, 1, 1, 1
	1, 1, 1, 1, 1

LCM = $2 \times 2 \times 3 \times 3 \times 5 \times 7 = 1260$ LCM = $2 \times 2 \times 2 \times 3 \times 3 \times 4 = 864$

(f) 3, 63, 147, 84

3	63, 147, 84
3	21, 49, 28
7	7, 49, 28
7	1, 7, 4
4	1, 1, 4
	1, 1, 1

LCM = $3 \times 3 \times 7 \times 7 \times 4 = 1764$

(g) 2, 48, 64, 72, 96, 108

2	48, 64, 72, 96, 108
2	24, 32, 36, 32, 54
2	12, 16, 18, 16, 27
3	6, 8, 9, 8, 27
3	3, 4, 9, 4, 27
3	1, 1, 3, 1, 9
4	1, 1, 1, 1, 3
	1, 1, 1, 1, 1

LCM = $2 \times 2 \times 2 \times 2 \times 4 \times 3 \times 3 \times 3 = 1728$

(h)	$\begin{array}{r l} 2 & 198, 135, 108, 54, 22 \\ \hline 3 & 99, 135, 54, 27, 11 \\ \hline 3 & 33, 45, 18, 9, 11 \\ \hline 3 & 11, 15, 6, 3, 11 \\ \hline 2 & 11, 5, 2, 1, 11 \\ \hline 5 & 11, 5, 1, 1, 11 \\ \hline 11 & 11, 1, 1, 1, 11 \\ \hline & 1, 1, 1, 1, 1 \end{array}$
-----	--

(i)	$\begin{array}{r l} 2 & 162, 135, 108 \\ \hline 3 & 81, 135, 54 \\ \hline 3 & 27, 45, 18 \\ \hline 3 & 9, 15, 6 \\ \hline 3 & 3, 5, 2 \\ \hline 2 & 1, 5, 2 \\ \hline 5 & 1, 5, 1 \\ \hline & 1, 1, 1 \end{array}$
-----	--

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

$$\text{LCM} = 2 \times 3 \times 3 \times 3 \times 3 \times 2 \times 5 = 1620$$

Exercise 4.3

1. One number = $\frac{\text{HCF} \times \text{LCM}}{\text{Other number}} = \frac{15 \times 450}{75} = 90$

2. $\text{LCM} = \frac{\text{product of two number}}{\text{HCF}} = \frac{3072}{16} = 192$

3. $\text{LCM} = \frac{\text{Product of two number}}{\text{HCF}} = \frac{15870}{23} = 690$

4. Yes, 1344 is exactly divisible by 24, therefore HCF and LCM may be 24 and 1344 respectively.

$$\begin{array}{r} 24 \overline{)1344} \\ \underline{-120} \\ 144 \\ \underline{-144} \\ 0 \end{array}$$

5. No, 204 is not exactly divisible by 16, therefore HCF and LCM may not be 16,204 respectively.

$$\begin{array}{r} 16 \overline{)204} \\ \underline{-16} \\ 44 \\ \underline{-32} \\ 12 \end{array}$$

6. $\text{HCF} = 2 \times 2 \times 2 = 8$

$$\rightarrow 56 + 40 = 96$$

Yes, HCF is the factor of 96

$$\rightarrow 56 - 40 = 16$$

Yes, HCF is the factor of 16.

$\begin{array}{r l} 2 & 40 \\ \hline 2 & 20 \\ \hline 2 & 10 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 2 & 56 \\ \hline 2 & 28 \\ \hline 2 & 14 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$
---	---

7. (a) First number = 25

Second number = 225

HCF

$$\text{HCF} = 5 \times 5 = 25$$

$$\text{LCM} = 5 \times 5 \times 9 = 225$$

$$\text{Product of 2 Nos} = \text{HCF} \times \text{LCM}$$

$$25 \times 225 = 25 \times 225$$

$$5625 = 5625$$

$$\text{LHS} = \text{RHS}$$

Hence verified

$\begin{array}{r l} 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 5 & 225 \\ \hline 5 & 45 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 5 & 25, 225 \\ \hline 5 & 5, 45 \\ \hline 9 & 1, 9 \\ \hline & 1, 1 \end{array}$
---	---	--

(b) 86, 154

HCF

$$86 = 2 \times 43; 154 = 2 \times 7 \times 11$$

$$\text{HCF} = 2$$

LCM

$$\text{LCM} = 2 \times 7 \times 11 \times 43 = 6622$$

$$\text{Product of 2 nos} = \text{HCF} \times \text{LCM}$$

$$86 \times 154 = 2 \times 6622; 13244 = 13244$$

$$\text{LHS} = \text{RHS}$$

$$\begin{array}{r|l} 2 & 86 \\ \hline 43 & 43 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 154 \\ \hline 7 & 77 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 86, 154 \\ \hline 7 & 43, 77 \\ \hline 11 & 43, 11 \\ \hline 43 & 43, 1 \\ \hline & 1, 1 \end{array}$$

Hence Verified

(c) 23, 69

HCF

$$23 = 23 \times 1; 69 = 3 \times 23$$

$$\text{HCF} = 23$$

$$\text{LCM} = 2 \times 3 \times 23 = 69$$

$$\text{Product of 2 nos} = \text{HCF} \times \text{LCM}$$

$$23 \times 69 = 23 \times 69; 1587 = 1587$$

$$\begin{array}{r|l} 23 & 23 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 3 & 69 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

LCM

$$\begin{array}{r|l} 23 & 23, 69 \\ \hline 3 & 1, 3 \\ \hline & 1, 1 \end{array}$$

$$\text{LHS} = \text{RHS}$$

Hence verified.

(d) 115, 575

HCF

$$115 = 5 \times 23; 575 = 5 \times 5 \times 23$$

$$\text{HCF} = 5 \times 23 = 115$$

$$\text{LCM} = 5 \times 5 \times 23 = 575$$

$$\text{Product of 2 Nos} = \text{HCF} \times \text{LCM}$$

$$115 \times 575 = 115 \times 575$$

$$66125 = 66125 \quad \text{LHS} = \text{RHS}$$

$$\begin{array}{r|l} 5 & 115 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

LCM

$$\begin{array}{r|l} 5 & 575 \\ \hline 5 & 115 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 115, 575 \\ \hline 5 & 23, 115 \\ \hline 23 & 23, 23 \\ \hline & 1, 1 \end{array}$$

Hence verified

Exercises 4.4

1. LCM of 15, 25, 35

$$\text{LCM} = 5 \times 3 \times 5 \times 7 = 525$$

$$\text{Hence } (525 + 5) = 530$$

2. LCM of 15, 25, 30

$$\text{LCM} = 5 \times 3 \times 2 \times 5 \times 3 = 150 \times 3 = 450$$

$$\text{Hence } (450 - 9) = 441$$

$$\begin{array}{r|l} 5 & 15, 25, 35 \\ \hline 3 & 3, 5, 7 \\ \hline 5 & 1, 5, 7 \\ \hline 7 & 1, 1, 7 \\ \hline & 1, 1, 1 \end{array}$$

$$\begin{array}{r|l} 5 & 15, 25, 30, 45 \\ \hline 3 & 3, 5, 6, 9 \\ \hline 2 & 1, 5, 2, 3 \\ \hline 5 & 1, 5, 1, 3, \\ \hline 3 & 1, 1, 1, 3 \\ \hline & 1, 1, 1, 1 \end{array}$$

3. LCM of 6, 8, 12, 20

$$\text{LCM} = 2 \times 2 \times 2 \times 3 \times 5 = 120 \text{ minutes}$$

They will rang after 120 minutes i.e. 2 hours from 8 am.

Hence Bells will ring at 10 am.

$$\begin{array}{r|l} 2 & 6, 8, 12, 20 \\ \hline 2 & 3, 4, 6, 10 \\ \hline 2 & 3, 2, 3, 5 \\ \hline 3 & 3, 1, 3, 5 \\ \hline 5 & 1, 1, 1, 5 \\ \hline & 1, 1, 1, 1 \end{array}$$

4. LCM of 48, 72, 108

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 432 \text{ second}$$

$$432 \text{ seconds} = 432 \div 60 = 7 \text{ minutes } 2 \text{ seconds}$$

Hence, traffic lights change

after 7 minutes 2 second again.

$$\begin{array}{r|l} 2 & 48, 72, 108 \\ \hline 2 & 24, 36, 54 \\ \hline 2 & 12, 18, 27 \\ \hline 3 & 6, 9, 27 \\ \hline 2 & 2, 3, 9 \\ \hline 3 & 1, 3, 9 \\ \hline 3 & 1, 1, 3 \\ \hline & 1, 1, 1 \end{array}$$

5. LCM of 25, 40, 60

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

$$\text{Hence } 600 + 7 = 607$$

$$\begin{array}{r|l} 5 & 25, 40, 60, \\ \hline 5 & 5, 8, 12 \\ \hline 2 & 1, 8, 12 \\ \hline 2 & 1, 4, 6 \\ \hline 2 & 1, 2, 3 \\ \hline 3 & 1, 1, 3 \\ \hline & 1, 1, 1 \end{array}$$

6. Length of the rectangular field = 122 m

Breadth of the rectangular field = 92 m

$$\text{Length of inside boundary} = 122 - 2 = 120 \text{ m}$$

$$\text{Breadth of inside boundary} = 92 - 2 = 90 \text{ m}$$

The length of the largest tapes is 30 m

$$\begin{array}{r} \text{HCF} \quad 90 \overline{)120} \overline{)1} \\ \underline{-90} \\ 30 \overline{)90} \overline{)3} \\ \underline{-90} \\ 0 \end{array}$$

7. HCF of 398, 436, 542

Greatest number which divides

$$(398 - 7), (436 - 11), (542 - 15)$$

New number are 391, 425, 527

Hence largest number that divides

the given number is 17.

$$\begin{array}{r} 391 \overline{)425} \overline{)31} \\ \underline{-391} \\ 34 \overline{)391} \overline{)11} \\ \underline{-34} \\ 51 \\ \underline{-34} \\ 17 \overline{)34} \overline{)2} \\ \underline{-34} \\ 0 \end{array} \quad \begin{array}{r} 17 \overline{)527} \overline{)31} \\ \underline{-51} \downarrow \\ 17 \\ \underline{-17} \\ 0 \end{array}$$

8. HCF of 850 and 680

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

Hence 170 litres is the maximum capacity of the container.

9. Length = 20 m 16 cm = 2016 cm
 Breadth = 15 m 60 cm = 1560 cm
 LCM of 2016 and 1560
 LCM = 131040
 \therefore 131040 tiles were required

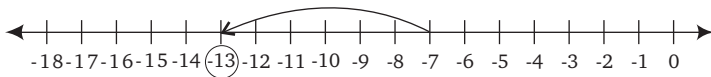
2	2016, 1560
2	1008, 780
2	504, 390
2	252, 195
2	126, 195
3	63, 195
3	21, 65
7	7, 65
5	1, 65
13	1, 13
	1, 1

Exercise 5.1

1. (a) $>$ (b) $>$ (c) $<$ (d) $<$ (e) $<$ (f) $<$ (g) $>$
 (h) $<$ (i) $>$ (j) $<$
2. (a) 4, -3, 5, 6, -7, 0, -8, 9
A. -8, -7, -3, 0, 4, 5, 6, 9
- (b) 1, -1, 2, -2, 13, -13
A. -13, -2, -1, 1, 2, 13
- (c) -150, 11, 15, 8, -10, -9
A. -150, -10, -9, 8, 11, 5
- (d) -41, 9, 0, -11, 3, 2
A. -41, -11, 0, 3, 9, 12
- (e) 4, -5, 0, 5, 7, -7, 8, -9
A. -9, 7, -5, 0, 4, 5, 7, 8
- (f) -128, 64, -39, 159, -16, 0, 110
A. -128, -39, -16, 0, 64, 110, 159
3. (a) -6, 7, -3, 4, -5, 3, 15
A. 15, 7, 4, 3, -3, -5, -6
- (b) -1, 2, 151, 11, -11, 14, -6
A. 151, 14, 11, 2, -1, -11, -16
- (c) 0, 10, 40, -40, -10, 95, -95
A. 95, 40, 10, 0, -10, -40, -95
- (d) 17, -7, 117, 19, -19, 53, 12
A. 117, 53, 19, 17, 12, -7, -19
- (e) 333, -3, -33, 3, -313, 33
A. 333, 33, 3, -3, -33, -313

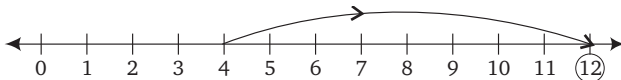
Exercise 5.2

1. (a) $-7 + (-6)$



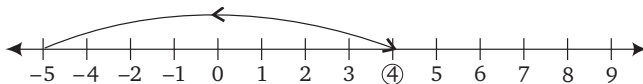
$$-7 - 6 = -13$$

- (b) $4 + 8$



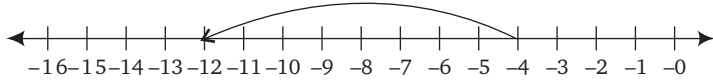
$$4 + 8 = 12$$

- (c) $-5 + (+9)$



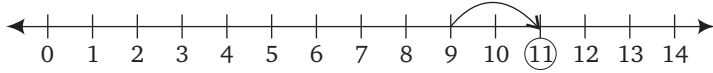
$$-5 + 9 = 4$$

(d) $-4 + (-8)$



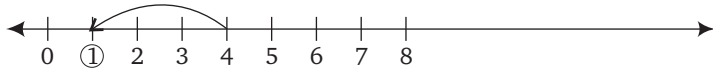
$$-4 - 8 = -12$$

(e) $9 + 2$



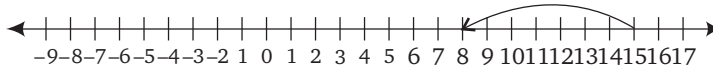
$$9 + 2 = 11$$

(f) $4 + (-3)$



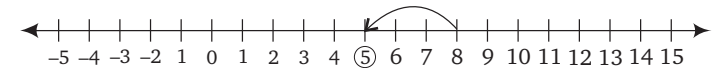
$$4 - 3 = 1$$

(g) $+15 + (-7)$



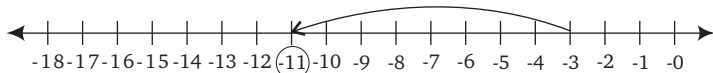
$$15 - 7 = 8$$

(h) $+8 + (-3)$



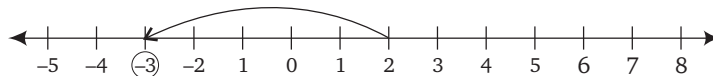
$$8 - 3 = 5$$

(i) $-3 + (-8)$



$$-3 - 8 = -11$$

(j) $+2 + (-5)$



$$2 - 5 = -3$$

2. (a) $(-6) - (+7) = -6 - 7 = -13$ (b) $+9 - (+6) = 9 - 6 = 3$
(c) $+4 - (-5) = 4 + 5 = 9$ (d) $-1 - (-3) = -1 + 3 = 2$
(e) $(-8) - (-5) - 8 + 5 = -3$
(f) $-5 + (-8) = -5 - 8 = -13$ (g) $(+1) - (-0) = 1 + 0 = 1$

(h) $15 - (-15) = 15 + 15 = 30$ (i) $(-1) - (+5) = -1 - 5 = -6$
 (j) $-4 - (-4) = -4 + 4 = 0$

3. (a) $(-3) \times (+5) = -15$ (b) $15 \times (-21) = -315$
 (c) $6 \times (-7) = -42$ (d) $32 \times (-5) \times 11 = -1760$
 (e) $\frac{-1}{102} \times 6 = \frac{-1}{17}$ (f) $\frac{3}{8} \times \frac{-8}{3} = \frac{-1}{1} = -1$

(g) $-45 \times \frac{-1}{9} = 5$

(h) $144 \times \frac{-1}{144} = -1$

(i) $-169 \times 72 \times -17 = 206856$

(j) $121 \times (-2) = -242$

(k) $-63 \times 22 \times \left(\frac{-2}{105}\right) = \frac{1386}{5} = 277 \frac{1}{5}$

(l) $12 \times \frac{31}{9} \times -17 = -68$

4. (a) $-63 \div (-9); \frac{+63}{-9} = 7$ (b) $72 \div (-3) = \frac{72}{(-3)} = -24$

(c) $(-121) \div (-11) = \frac{-121}{-11} = 11$ (d) $(-330) \div (-1) = \frac{-300}{-1} = 330$

(e) $(-5676) \div (-132) = \frac{-5676}{-132} = 43$

(f) $0 \div (-154) = 0$ (g) $(190) \div (-1) = \frac{190}{(-1)} = -190$

(h) $696 \div (-696) = \frac{696}{-696} = -1$ (i) $(-18) \div (-2) = \frac{18}{2} = 9$

(j) $(-47) \div (+47) = \frac{-47}{47} = -1$

(k) $(-176) \div (8) = \frac{-176}{8} = -22$

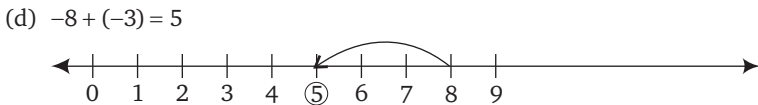
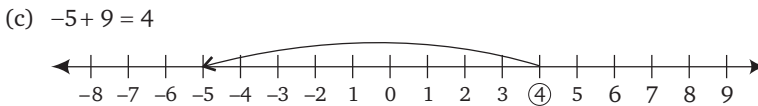
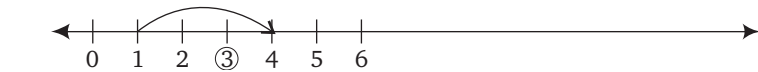
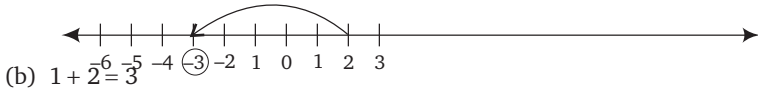
(l) $250 \div (+25) = \frac{250}{25} = 10$

5. (a) -121 $[11 \times (-11)]$ (b) -10 $[-1 \times 10]$
 (c) -3 $[363 \div (-121)]$ (d) 356 $[356 \div 1]$
 (e) 13 $[-260 \div (-20)]$ (f) -15 $[-6165 \div 411]$
 (g) -153 $[9 \times (-17)]$ (h) -5 $[-5 \div 1]$

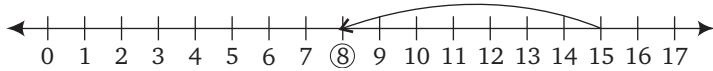
- (i) $0 \quad [0 \div (-156)]$ (j) $-3 \quad [75 \div (-25)]$
 (k) $149 \quad [149 \times (-1)]$ (l) $-12 \quad [168 \div (-14)]$
6. (a) $\frac{-6}{4} \times (-2) = 3$ (b) $156 \times \frac{-1}{3} = -52$
 (c) $-7 \times \frac{1}{21} = \frac{-1}{3}$ (d) $-175 \times \frac{21}{5} = -35 \times 21 = -735$
 (e) $\frac{125}{3} \times \frac{-99}{133} = \frac{-4125}{133} = -31 \frac{2}{133}$
 (f) $\frac{-266}{5} \times \frac{400}{133} = -160$ (g) $168 \times \frac{-5}{126} = -70$
 (h) $11 \times \frac{-1}{12} = \frac{-1}{12}$ (i) $(-625) \times \frac{13}{25} = \frac{-25}{13} = -1 \frac{12}{13}$
 (j) $12 \times \left(\frac{-4}{21}\right) = \frac{-16}{7} = -2 \frac{2}{7}$ (k) $\frac{0}{90} \div \frac{10}{21} = \frac{0}{90} \times \frac{21}{10} = 0 \times \frac{21}{10} = 0$
 (l) $-300 \times \left(\frac{-3}{100}\right) = 9$

Exercise 5.3

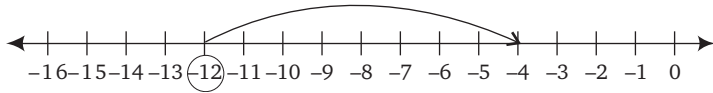
1. (a) $2 + (-5) = 2 - 5 = -3$



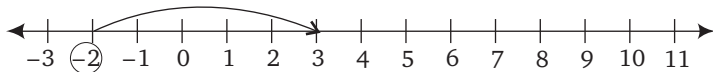
(g) $15 + (-7) = 15 - 7 = 8$



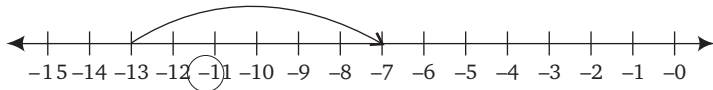
(h) $-4 + (-8) = -4 - 8 = -12$



(i) $3 + (-5) = -2$



(j) $(-7) + (-6) = -7 - 6 = -13$



2. (a) True (b) True (c) True (d) false (e) True (f) True (g) True (h) True
 (i) False (j) True (k) False (l) False

3. (a) $|7 + 2| = |7| + |2| = 9 = 7 + 2; 9 = 9$

LHS = RHS

Hence verified

(b) $|-2 - 3| = |(-2) + (-3)|; |-5| = |-2 - 3|; 5 = |-5|; 5 = 5$

LHS = RHS

Hence verified

(c) $|8 + (-6)| = |-3| + |-5|; |-8 - 6| = 3 + 5; |-14| = 8; 14 = 8$

LHS \neq RHS

Hence verified

(d) $|2 + (-7)| = |2| + |-7|$

$|2 - 7| = 2 + 7;$

$|-5| = 9;$

$5 = 9$

LHS \neq RHS

Hence verified

(e) $|-15 - (-4)| = |-15| - |-4|$

$|-15 + 4| = 15 - 4;$

$|-11| = 11;$

$11 = 11$

LHS = RHS

Hence verified

(f) $|-3 + 5| = |-3| + |5|;$

$|-2| = 3 + 5;$

$2 = 8$

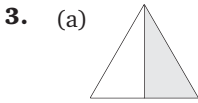
LHS \neq RHS

Hence verified

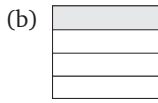
Exercise 6.1

1. (a) $\frac{2}{3}$ (b) $\frac{5}{9}$ (d) $\frac{22}{31}$ (e) $\frac{11}{13}$ (g) $\frac{100}{500}$ (h) $\frac{7}{13}$

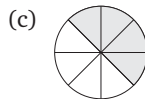
2. (a) $\frac{4}{7}$ (b) $\frac{2}{7}$ (c) $\frac{6}{11}$ (d) $\frac{1}{2}$ (e) $\frac{1}{4}$ (f) $\frac{3}{4}$ (g) $\frac{6}{9}$ (h) $\frac{1}{3}$ (i) $\frac{3}{5}$ (j) $\frac{9}{3}$



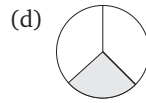
$$\frac{-1}{2}$$



$$\frac{1}{4}$$



$$\frac{4}{8}$$



$$\frac{1}{3}$$

4. (a) ✓ (b) ✗ (c) ✗ (d) ✓ (e) ✓ (f) ✗ (g) ✓ (h) ✗ (i) ✓

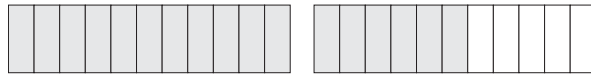
5. (a) $\frac{11}{7} = 1 + \frac{4}{7}$



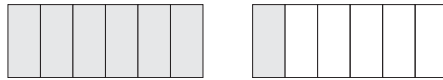
(b) $\frac{8}{5} = 1 + \frac{3}{5}$



(c) $\frac{17}{11} = 1 + \frac{6}{11}$

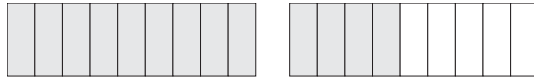


(d) $\frac{7}{6} = 1 + \frac{1}{6}$



(e) $\frac{13}{9}$

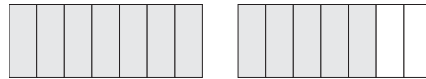
$$\frac{13}{9} = 1 + \frac{4}{9}$$



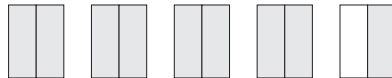
(f) $\frac{12}{5} = 1 + 1 + \frac{2}{5}$



(g) $\frac{12}{7}, 1 + \frac{5}{7}$



(h) $\frac{9}{2}, \frac{9}{2} = 1 + 1 + 1 + 1 + \frac{1}{2}$



(i) $\frac{7}{3} = 1 + 1 + \frac{1}{3}$



6. (a) $2\frac{2}{5} = \frac{12}{5}$ (b) $2\frac{3}{72} = \frac{147}{72}$ (c) $6\frac{1}{2} = \frac{13}{2}$
 (d) $11\frac{1}{11} = \frac{122}{11}$ (e) $5\frac{4}{7} = \frac{39}{7}$ (f) $4\frac{5}{8} = \frac{37}{8}$
 (g) $9\frac{2}{3} = \frac{29}{3}$ (h) $2\frac{1}{8} = \frac{17}{8}$ (i) $5\frac{4}{5} = \frac{29}{5}$
 (j) $4\frac{1}{6} = \frac{25}{6}$

7. (a) $\frac{2}{5} \square \frac{1}{3}$

LCM of 5 and 3 = 15

$$\frac{2}{5} \times \frac{3}{3} = \frac{6}{15}; \frac{1}{3} \times \frac{5}{5} = \frac{5}{15}; \frac{6}{15} > \frac{5}{15} \quad \therefore \frac{2}{5} > \frac{1}{3}$$

(b) $\frac{1}{12} \square \frac{5}{7}$

LCM of 12 and 7 = 84

$$\frac{1}{12} \times \frac{7}{7} = \frac{7}{84}; \frac{5}{7} \times \frac{12}{12} = \frac{60}{84}; \frac{7}{84} < \frac{60}{84} \quad \therefore \frac{1}{12} < \frac{5}{7}$$

(c) $\frac{2}{8} \square \frac{3}{5}$

LCM of 8 and 5 = 40

$$\frac{2}{8} \times \frac{5}{5} = \frac{10}{40}; \frac{3}{5} \times \frac{8}{8} = \frac{24}{40}; \frac{10}{40} < \frac{24}{40} \quad \therefore \frac{2}{8} < \frac{3}{5}$$

(d) $\frac{4}{5} \square \frac{3}{4}$

LCM of 5 and 4 = 20

$$\frac{4}{5} \times \frac{4}{4} = \frac{16}{20}; \frac{3}{4} \times \frac{5}{5} = \frac{15}{20}; \frac{16}{20} > \frac{15}{20} \quad \therefore \frac{4}{5} > \frac{3}{4}$$

(e) $\frac{7}{10} \square \frac{14}{20}$

LCM of 10 and 20 = 20

$$\frac{7}{10} \times \frac{2}{2} = \frac{14}{20}; \frac{14}{20} \times \frac{1}{1} = \frac{14}{20}; \frac{14}{20} = \frac{14}{20} \quad \therefore \frac{7}{10} = \frac{14}{20}$$

(f) $\frac{9}{15} = \frac{9}{15}$

8. $\frac{8}{11} \times \frac{6}{11} \times \frac{2}{11} \times \frac{5}{11} \times \frac{5}{14} \times \frac{3}{14} \times \frac{9}{14} \times \frac{1}{14} \times \frac{6}{19} \times \frac{4}{19} \times \frac{7}{11} \times \frac{11}{19} \times \frac{18}{19}$

9. (a) $\left(\frac{1}{2}\right), \frac{3}{4}, \left(\frac{5}{2}\right), \frac{2}{7}, \left(\frac{3}{2}\right), \frac{5}{9}$ (b) $\left(\frac{1}{11}\right), \frac{5}{19}, \left(\frac{2}{11}\right), \frac{11}{13}, \left(\frac{21}{11}\right), \frac{11}{18}$
 (c) $\left(\frac{5}{9}\right), \frac{1}{7}, \left(\frac{2}{9}\right), \frac{5}{17}, \frac{2}{8}, \left(\frac{7}{9}\right)$

10. (a) UL (b) UL (c) L (d) UL

11. $\frac{2}{5}$

(a)	$\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$	$\frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$	$\frac{2}{5} \times \frac{4}{4} = \frac{8}{20}$
(b)	$\frac{3}{7} \times \frac{2}{2} = \frac{6}{14}$	$\frac{3}{7} \times \frac{3}{3} = \frac{9}{21}$	$\frac{3}{7} \times \frac{4}{4} = \frac{12}{28}$
(c)	$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$	$\frac{5}{6} \times \frac{3}{3} = \frac{15}{18}$	$\frac{5}{6} \times \frac{4}{4} = \frac{20}{24}$
(d)	$\frac{29}{31} \times \frac{2}{2} = \frac{58}{62}$	$\frac{29}{31} \times \frac{3}{3} = \frac{87}{93}$	$\frac{29}{31} \times \frac{4}{4} = \frac{116}{124}$
(e)	$\frac{11}{13} \times \frac{2}{2} = \frac{22}{26}$	$\frac{11}{13} \times \frac{3}{3} = \frac{33}{39}$	$\frac{11}{13} \times \frac{4}{4} = \frac{44}{52}$
(f)	$\frac{4}{17} \times \frac{2}{2} = \frac{8}{34}$	$\frac{4}{17} \times \frac{3}{3} = \frac{12}{51}$	$\frac{4}{17} \times \frac{4}{4} = \frac{16}{68}$
(g)	$\frac{4}{16} \times \frac{2}{2} = \frac{8}{32}$	$\frac{4}{16} \times \frac{3}{3} = \frac{12}{48}$	$\frac{4}{16} \times \frac{4}{4} = \frac{16}{64}$
(h)	$\frac{9}{12} \times \frac{2}{2} = \frac{18}{24}$	$\frac{9}{12} \times \frac{3}{3} = \frac{27}{36}$	$\frac{9}{12} \times \frac{4}{4} = \frac{36}{48}$
(i)	$\frac{23}{31} \times \frac{2}{2} = \frac{46}{62}$	$\frac{23}{31} \times \frac{4}{4} = \frac{92}{124}$	$\frac{23}{31} \times \frac{3}{3} = \frac{69}{93}$
(j)	$\frac{1}{10} \times \frac{2}{2} = \frac{2}{20}$	$\frac{1}{10} \times \frac{3}{3} = \frac{3}{30}$	$\frac{1}{10} \times \frac{4}{4} = \frac{4}{40}$

12. (a) $\frac{2}{3} \times \frac{7}{7} = \frac{14}{21}$ (b) $\frac{1}{5} \times \frac{6}{6} = \frac{6}{30}$
 (c) $\frac{2}{7} \times \frac{3}{3} = \frac{6}{21}$ (d) $\frac{1}{5} \times \frac{30}{30} = \frac{30}{150}$
 (e) $\frac{2}{7} \times \frac{8}{8} = \frac{16}{56}$ (f) $\frac{7}{9} \times \frac{7}{7} = \frac{49}{63}$
 (g) $\frac{2}{7} \times \frac{10}{10} = \frac{20}{70}$ (h) $\frac{1}{3} \times \frac{10}{10} = \frac{10}{30}$

13. (a) $\frac{120}{144} = \frac{5}{6}$ (b) $\frac{112}{196} = \frac{4}{7}$ (c) $\frac{253}{483} = \frac{11}{21}$

$$(d) \frac{135}{333} = \frac{15}{37}$$

$$(e) \frac{80}{324} = \frac{20}{81}$$

$$(f) \frac{135}{55} = \frac{27}{11}$$

$$(g) \frac{60}{182} = \frac{30}{91}$$

$$(h) \frac{133}{209} = \frac{7}{11}$$

$$(i) \frac{21}{147} = \frac{1}{7}$$

$$(j) \frac{52}{130} = \frac{2}{5}$$

Exercise 6.2

1. (a) $\frac{22}{25}$ or $\frac{13}{15}$

LCM of 25 and 15 = 75

$$\frac{22}{25} \times \frac{3}{3} = \frac{66}{75}; \frac{13}{15} \times \frac{5}{5} = \frac{65}{75} \therefore \frac{66}{75} > \frac{65}{75}$$

Hence $\frac{13}{15}$ is smaller fraction.

$$\begin{array}{r|l} 5 & 25, 15 \\ \hline 5 & 5, 3 \\ \hline 3 & 1, 3 \\ \hline & 1, 1 \end{array}$$

(b) $\frac{7}{10}$ or $\frac{5}{8}$

LCM of 10 and 8 is = 40

$$\frac{7}{10} \times \frac{4}{4} = \frac{28}{40}; \frac{5}{8} \times \frac{5}{5} = \frac{25}{40} \therefore \frac{28}{40} > \frac{25}{40}$$

Hence $\frac{5}{8}$ is smaller fraction.

$$\begin{array}{r|l} 2 & 10, 8 \\ \hline 2 & 5, 4, \\ \hline 2 & 5, 2 \\ \hline 5 & 5, 1 \\ \hline & 1, 1 \end{array}$$

(c) $\frac{3}{4}$ or $\frac{4}{5}$

LCM of 4 and 5 is 20

$$\frac{3}{4} \times \frac{5}{5} = \frac{15}{20}; \frac{4}{5} \times \frac{4}{4} = \frac{16}{20} \therefore \frac{15}{20} < \frac{16}{20}$$

Hence $\frac{3}{4}$ is smaller fraction.

(d) $\frac{16}{19}$ or $\frac{14}{95}$

LCM of 19 and 95 = 95

$$\frac{16}{19} \times \frac{5}{5} = \frac{80}{95}; \frac{14}{95} \times \frac{1}{1} = \frac{14}{95} \therefore \frac{80}{95} > \frac{14}{95}$$

Hence $\frac{14}{95}$ is smaller fraction

$$\begin{array}{r|l} 19 & 19, 95, \\ \hline 5 & 1, 5 \\ \hline & 1, 1 \end{array}$$

(e) $\frac{9}{16}$ or $\frac{7}{12}$

LCM of 16 and 12 is 48

$$\frac{9}{16} \times \frac{3}{3} = \frac{27}{48}; \frac{7}{12} \times \frac{4}{4} = \frac{28}{48} \therefore \frac{27}{48} < \frac{28}{48}$$

$$\begin{array}{r|l} 2 & 16, 12 \\ \hline 2 & 8, 6 \\ \hline 2 & 4, 3 \\ \hline 2 & 2, 3 \\ \hline 3 & 1, 3 \\ \hline & 1, 1 \end{array}$$

Hence $\frac{9}{16}$ is smaller fraction

(f) $\frac{5}{13}$ or $\frac{5}{8}$ LCM of 13 and 8 is 104

$$\frac{5}{13} \times \frac{8}{8} = \frac{40}{104}; \frac{5}{8} \times \frac{13}{13} = \frac{65}{104} \therefore \frac{40}{104} < \frac{65}{104}$$

Hence $\frac{5}{13}$ is smaller fraction.

2. (a) $\frac{4}{7}$ or $\frac{3}{5}$ LCM of 7 and 5 is 35

$$\frac{4}{7} \times \frac{5}{5} = \frac{20}{35}; \frac{3}{5} \times \frac{7}{7} = \frac{21}{35} \therefore \frac{20}{35} < \frac{21}{35}$$

Hence $\frac{3}{5}$ is larger fraction

(b) $\frac{11}{18}$ or $\frac{13}{15}$ LCM of 18 and 15 is 90

$$\frac{11}{18} \times \frac{5}{5} = \frac{55}{90}; \frac{13}{15} \times \frac{6}{6} = \frac{78}{90} \therefore \frac{55}{90} < \frac{78}{90}$$

Hence $\frac{13}{15}$ is larger fraction.

3	18, 15
3	8, 5
2	2, 5
5	1, 5
	1, 1

(c) $\frac{14}{29}$ or $\frac{7}{14}$ LCM of 29 and 14 is 406

$$\frac{14}{29} \times \frac{14}{14} = \frac{196}{406}; \frac{7}{14} \times \frac{29}{29} = \frac{203}{406} \therefore \frac{196}{406} < \frac{203}{406}$$

Hence $\frac{7}{14}$ is larger fraction.

(d) $\frac{5}{9}$ or $\frac{7}{15}$ LCM of 9 and 15 is 45

$$\frac{5}{9} \times \frac{5}{5} = \frac{25}{45}; \frac{7}{15} \times \frac{3}{3} = \frac{21}{45} \therefore \frac{25}{45} > \frac{21}{45}$$

Hence $\frac{5}{9}$ is larger fraction.

3	9, 15
3	3, 5
5	1, 5
	1, 1

(e) $\frac{20}{39}$ or $\frac{30}{91}$ LCM of 39 and 91 is 273

$$\frac{20}{39} \times \frac{7}{7} = \frac{140}{273}; \frac{30}{91} \times \frac{3}{3} = \frac{90}{273} \therefore \frac{140}{273} > \frac{90}{273}$$

Hence $\frac{20}{39}$ is larger fraction.

13	91, 39
7	7, 3
3	1, 3
	1, 1

(f) $\frac{15}{49}$ or $\frac{17}{63}$ LCM of 49 and 63 = 441

$$\frac{15}{49} \times \frac{9}{9} = \frac{135}{441}; \frac{17}{63} \times \frac{7}{7} = \frac{119}{441} \quad \therefore \frac{135}{441} > \frac{119}{441}$$

7	49, 63
3	7, 9
3	7, 3
7	7, 1
1	1

Hence $\frac{15}{49}$ is larger fraction.

4. (a) $\frac{4}{14}, \frac{4}{7}, \frac{3}{8}, \frac{1}{16}$ LCM of 14, 7, 8, 16 is 112

$$\frac{4}{14} \times \frac{8}{8} = \frac{32}{112}; \frac{4}{7} \times \frac{16}{16} = \frac{64}{112}; \frac{3}{8} \times \frac{14}{14} = \frac{42}{112};$$

$$\frac{1}{16} \times \frac{7}{7} = \frac{7}{112}$$

Descending order

$$\frac{64}{112}, \frac{42}{112}, \frac{32}{112}, \frac{7}{112} \quad \text{Hence } \frac{4}{7} > \frac{3}{8} > \frac{4}{14} > \frac{1}{16}$$

2	14, 7, 8, 16
7	7, 7, 4, 8
4	1, 1, 4, 8
2	1, 1, 1, 2
1	1, 1, 1, 1

3. (a) Part is after

(b) $\frac{2}{5}, \frac{3}{4}, \frac{7}{12}, \frac{11}{20}$

LCM of 5, 4, 12, 20 = 60

$$\frac{2}{5} \times \frac{12}{12} = \frac{24}{60}; \frac{3}{4} \times \frac{15}{15} = \frac{45}{60}; \frac{7}{12} \times \frac{5}{5} = \frac{35}{60}; \frac{11}{20} \times \frac{3}{3} = \frac{33}{60}$$

Ascending order

$$\frac{24}{60}, \frac{33}{60}, \frac{35}{60}, \frac{45}{60}$$

$$\text{Hence } \frac{2}{5} < \frac{11}{20} < \frac{7}{12} < \frac{3}{4}$$

(c) $\frac{4}{7}, \frac{3}{8}, \frac{5}{14}, \frac{11}{18}$

LCM of 7, 8, 14, 18 is 504

$$\frac{4}{7} \times \frac{63}{63} = \frac{252}{504}; \frac{3}{8} \times \frac{63}{63} = \frac{189}{504}; \frac{5}{14} \times \frac{36}{36} = \frac{180}{504};$$

$$\frac{11}{18} \times \frac{28}{28} = \frac{308}{504}$$

Ascending order

$$\frac{180}{504}, \frac{189}{504}, \frac{252}{504}, \frac{308}{504} \quad \text{Hence } \frac{5}{14} < \frac{3}{8} < \frac{4}{7} < \frac{11}{18}$$

5	5, 4, 12, 20
4	1, 4, 12, 4
3	1, 1, 3, 1
1	1, 1, 1, 1

2	7, 8, 14, 18
2	7, 4, 7, 9
2	7, 2, 7, 9
9	7, 1, 7, 9
7	7, 1, 7, 1
1	1, 1, 1, 1

(a) $\frac{4}{9}, \frac{7}{3}, \frac{7}{8}, \frac{5}{6}$ LCM of 9, 3, 8, 6 = 72

$$\frac{4}{9} \times \frac{8}{8} = \frac{32}{72}; \frac{7}{3} \times \frac{24}{24} = \frac{168}{72}; \frac{7}{8} \times \frac{9}{9} = \frac{63}{72}$$

(d) $\frac{7}{12}, \frac{3}{10}, \frac{2}{15}, \frac{1}{21}$

LCM of 12, 10, 15, 21 is 420

$$\frac{7}{12} \times \frac{35}{35} = \frac{245}{420}; \frac{3}{10} \times \frac{42}{42} = \frac{126}{420}; \frac{2}{15} \times \frac{28}{28} = \frac{56}{420}$$

$$\frac{1}{21} \times \frac{20}{20} = \frac{20}{420}$$

Ascending order

$$\frac{20}{420}, \frac{56}{420}, \frac{126}{420}, \frac{245}{420}$$

Hence $\frac{1}{21} < \frac{2}{15} < \frac{3}{10} < \frac{7}{12}$

(e) $\frac{17}{8}, \frac{11}{2}, \frac{13}{4}, \frac{15}{6}$ LCM of 8, 2, 4, 6 is 24

$$\frac{17}{8} \times \frac{3}{3} = \frac{51}{24}; \frac{11}{2} \times \frac{12}{12} = \frac{132}{24}; \frac{3}{4} \times \frac{6}{6} = \frac{18}{24}$$

$$\frac{15}{6} \times \frac{4}{4} = \frac{60}{24}$$

Ascending order

$$\frac{18}{24}, \frac{51}{24}, \frac{60}{24}, \frac{132}{24}$$

Hence $\frac{3}{4} < \frac{17}{8} < \frac{15}{6} < \frac{11}{2}$

4. (a) $\frac{4}{9}, \frac{7}{12}, \frac{2}{3}, \frac{11}{20}$

LCM of 9, 12, 3, 20 is 180

$$\frac{4}{9} \times \frac{20}{20} = \frac{80}{180}; \frac{7}{12} \times \frac{15}{15} = \frac{105}{180}; \frac{2}{3} \times \frac{60}{60} = \frac{120}{180};$$

$$\frac{11}{20} \times \frac{9}{9} = \frac{99}{180}$$

Descending order

$$\frac{120}{180}, \frac{99}{180}, \frac{105}{180}, \frac{80}{180}$$

Hence $\frac{2}{3} > \frac{11}{20} > \frac{7}{12} > \frac{4}{9}$

(c) $\frac{35}{8}, \frac{23}{4}, \frac{51}{6}, 1$ LCM of 8, 4, 6 is 24

$$\frac{35}{8} \times \frac{3}{3} = \frac{105}{24}; \frac{23}{4} \times \frac{6}{6} = \frac{138}{24}; \frac{51}{6} \times \frac{4}{4} = \frac{204}{24}; \frac{1}{1} \times \frac{24}{24} = \frac{24}{24} = 1$$

3	9, 3, 8, 6
3	3, 1, 8, 2
2	1, 1, 8, 2
2	1, 1, 4, 2
2	1, 1, 2, 1
	1, 1, 1, 1

2	12, 10, 15, 21
5	6, 5, 15, 21
3	6, 1, 3, 21
2	2, 1, 1, 7
7	1, 1, 1, 7
	1, 1, 1, 1

2	8, 2, 4, 6
2	4, 1, 2, 3
2	2, 1, 1, 3
3	1, 1, 1, 3
	1, 1, 1, 1

2	9, 12, 3, 20
2	9, 6, 3, 10
3	9, 3, 3, 5
3	3, 1, 1, 5
5	1, 1, 1, 5
	1, 1, 1, 1

2	8, 4, 6
2	4, 2, 3
2	2, 1, 3
3	1, 1, 3
	1, 1, 1

Descending order

$$1, \frac{204}{25}, \frac{138}{24}, \frac{105}{24} \quad \text{Hence } 1 > \frac{51}{6} > \frac{23}{4} > \frac{35}{8}$$

(d) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{8}$ LCM of 2, 3, 4, 8 is 24

$\frac{1}{2} \times \frac{12}{12} = \frac{12}{24}; \frac{1}{3} \times \frac{8}{8} = \frac{8}{24}; \frac{1}{4} \times \frac{6}{6} = \frac{6}{24}; \frac{1}{8} \times \frac{3}{3} = \frac{3}{24}$	$\begin{array}{r} 2 \mid 2, 3, 4, 8 \\ \hline 2 \mid 1, 3, 2, 4 \\ \hline 2 \mid 1, 3, 1, 2 \\ \hline 3 \mid 1, 3, 1, 1 \\ \hline 1, 1, 1, 1 \end{array}$
---	---

Descending order

$$\frac{12}{24}, \frac{8}{24}, \frac{6}{24}, \frac{3}{24} \quad \text{Hence } \frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{8}$$

(e) $\frac{5}{12}, \frac{4}{9}, \frac{5}{8}, \frac{7}{9}$

LCM of 12, 9, 8, 9 is 72	$\begin{array}{r} 2 \mid 12, 8, 9 \\ \hline 2 \mid 6, 4, 9 \\ \hline 2 \mid 3, 2, 9 \\ \hline 3 \mid 3, 1, 9 \\ \hline 3 \mid 1, 1, 3 \\ \hline 1, 1, 1 \end{array}$
$\frac{5}{12} \times \frac{6}{6} = \frac{30}{72}; \frac{4}{9} \times \frac{8}{8} = \frac{32}{72}; \frac{5}{8} \times \frac{9}{9} = \frac{45}{72}; \frac{7}{9} \times \frac{8}{8} = \frac{56}{72}$	

Descending order

$$\frac{56}{72}, \frac{45}{72}, \frac{32}{72}, \frac{30}{72} \quad \text{Hence } \frac{7}{9} > \frac{5}{8} > \frac{4}{9} > \frac{5}{12}$$

Exercise 6.3

- | | | | |
|----|-----|---|--|
| 1. | (a) | $\frac{3}{4} + \frac{5}{8}$ LCM of 4 and 8 is 8 = $\frac{6+5}{8} = \frac{11}{8}$ | $\begin{array}{r} 4 \mid 4, 8 \\ \hline 2 \mid 1, 2 \\ \hline 1, 1 \end{array}$ |
| | (b) | $\frac{1}{5} - \frac{1}{15}$ LCM of 5 and 15 is 15 = $\frac{3-1}{15} = \frac{2}{15}$ | |
| | (c) | $\frac{2}{9} + \frac{1}{3}$ LCM of 9 and 3 is 9 = $\frac{2+3}{9} = \frac{5}{9}$ | |
| | (d) | $\frac{1}{5} - \frac{2}{25}$ LCM of 5 and 25 is 25 = $\frac{5-2}{25} = \frac{3}{25}$ | |
| | (e) | $\frac{2}{11} - \frac{1}{33}$ LCM of 11 and 33 is 33 = $\frac{6-1}{33} = \frac{5}{33}$ | |
| | (f) | $\frac{1}{2} - \frac{1}{16}$ LCM of 2 and 16 is 16 = $\frac{8-1}{16} = \frac{7}{16}$ | $\begin{array}{r} 2 \mid 2, 16 \\ \hline 2 \mid 1, 8 \\ \hline 4 \mid 1, 4 \\ \hline 1, 1 \end{array}$ |
| | (g) | $\frac{3}{5} + \frac{13}{20}$ LCM of 5 and 20 is 20. = $\frac{12+13}{20} = \frac{25}{20} = \frac{5}{4}$ | |
| | (h) | $\frac{1}{8} - \frac{5}{48}$ LCM of 8 and 48 is 48 = $\frac{6-5}{48} = \frac{1}{48}$ | $\begin{array}{r} 8 \mid 8, 48 \\ \hline 2 \mid 1, 6 \\ \hline 3 \mid 1, 3 \\ \hline 1, 1 \end{array}$ |
| | (i) | $\frac{1}{7} + \frac{4}{21}$ LCM of 7 and 21 is 21 = $\frac{3+4}{21} = \frac{7}{21} = \frac{1}{3}$ | |

$$(j) \frac{1}{12} - \frac{3}{24} \text{ LCM of 12 and 24 is 24} = \frac{2-3}{24} = \frac{-1}{24}$$

$$2. (a) 1\frac{1}{4} + 3\frac{1}{2} = \frac{5}{4} + \frac{7}{2} \text{ LCM of 4 and 2 is 4} = \frac{5+14}{4} = \frac{19}{4} = 4\frac{3}{4}$$

$$(b) 2\frac{5}{6} - 1\frac{1}{12} = \frac{17}{6} - \frac{13}{12} \text{ LCM of 6 and 12 is 12} = \frac{34-13}{12} = \frac{21}{12} = 1\frac{9}{12}$$

$$(c) 5\frac{1}{2} - 2\frac{1}{4} = \frac{11}{2} - \frac{9}{4} \text{ LCM of 2 and 4 is 4} = \frac{22-9}{4} = \frac{13}{4} = 3\frac{1}{4}$$

$$(d) 1\frac{1}{12} + 2\frac{3}{14} = \frac{13}{12} + \frac{31}{14} \text{ LCM of 12 and 14 is 84}$$

$$= \frac{91+186}{84} = \frac{277}{84} = 3\frac{25}{84}$$

3	12, 9, 3
3	4, 3, 1
4	4, 1, 1
	1, 1, 1

$$(e) 11\frac{2}{3} + 4\frac{1}{6} = \frac{35}{3} + \frac{25}{6} \text{ LCM of 3 and 6 is 6} = \frac{70+25}{6} = \frac{95}{6} = 15\frac{5}{6}$$

$$(f) 1\frac{1}{5} + 2\frac{1}{30} = \frac{6}{5} + \frac{61}{30} \text{ LCM of 5 and 30 is 30} = \frac{36+61}{30} = \frac{97}{30} = 3\frac{7}{30}$$

$$(g) 7\frac{2}{21} - 3\frac{8}{7} = \frac{149}{21} - \frac{29}{7} \text{ LCM of 21 and 7 is 21}$$

$$= \frac{149-87}{21} = \frac{62}{21} = 2\frac{20}{21}$$

$$(h) 13\frac{2}{7} - 1\frac{1}{35} = \frac{93}{7} - \frac{36}{35} \text{ LCM of 7 and 35 is 35}$$

$$= \frac{465-36}{35} = \frac{429}{35} = 12\frac{9}{35}$$

$$(i) 1\frac{1}{3} + 1\frac{1}{9} = \frac{4}{3} + \frac{10}{9} \text{ LCM of 3 and 9 is 9} = \frac{12+10}{9} = \frac{22}{9} = 2\frac{4}{9}$$

$$(j) 7\frac{5}{9} + 3\frac{2}{3} = \frac{68}{9} + \frac{11}{3} \text{ LCM of 9 and 3 is 9}$$

$$= \frac{68+33}{9} = \frac{101}{9} = 11\frac{2}{9}$$

$$3. (a) 3\frac{5}{12} - 4\frac{4}{9} + 3\frac{1}{3} = \frac{41}{12} - \frac{40}{9} + \frac{10}{3}$$

LCM of 12, 9, 3 is 36

$$= \frac{123-160+120}{36} = \frac{243-160}{36} = \frac{83}{36} = 2\frac{11}{36}$$

$$(b) \frac{1}{20} + \frac{17}{20} + \frac{21}{40}$$

LCM of 20 and 40 is 40

3	12, 9, 3
3	4, 3, 1
4	4, 1, 1
	1, 1, 1

36)83(2
	-72
	11

$$= \frac{2+34+21}{40} = \frac{57}{40} = \frac{17}{40}$$

(c) $2\frac{3}{11} + 4\frac{1}{9} + \frac{1}{3} = \frac{25}{11} + \frac{37}{9} + \frac{1}{3}$

LCM of 11, 9, 3 is 99

$$= \frac{225+407+33}{99} = \frac{665}{99} = 6\frac{71}{99}$$

(d) $9\frac{7}{15} - 7\frac{2}{7} + \frac{4}{5} = \frac{142}{15} - \frac{51}{7} + \frac{4}{5}$

LCM of 7, 15, 5 is 105

$$= \frac{994-765+84}{105} = \frac{313}{105} = 2\frac{103}{105}$$

(c) $7\frac{1}{4} + 2\frac{1}{6} - 3\frac{7}{8} = \frac{29}{4} + \frac{13}{6} - \frac{31}{8}$

LCM of 4, 6, 8 is 24

$$= \frac{174+52-93}{24} = \frac{133}{24} = 5\frac{13}{24}$$

(f) $11\frac{2}{3} + 9\frac{1}{4} - 2\frac{1}{5} = \frac{35}{3} + \frac{37}{4} - \frac{11}{5}$

LCM of 3, 4 and 5 is 60

$$= \frac{700+555-132}{60} = \frac{1123}{60} = 18\frac{43}{60}$$

(g) $1\frac{9}{20} + 2\frac{7}{15} - 1\frac{2}{3} = \frac{29}{20} + \frac{37}{15} - \frac{5}{3}$

LCM of 20, 15, 3 is 60

$$= \frac{87+148-100}{60} = \frac{135}{60} = \frac{27}{124} = \frac{9}{4} = 2\frac{1}{4}$$

(h) $3\frac{1}{2} - 2\frac{2}{3} + 1\frac{1}{4} = \frac{7}{2} - \frac{8}{3} + \frac{5}{4}$

LCM of 2, 3, 4 is 12

$$= \frac{42-32+15}{12} = \frac{25}{12} = 2\frac{1}{12}$$

(i) $5\frac{1}{2} + 2\frac{1}{3} + 4\frac{1}{5} = \frac{11}{2} + \frac{7}{3} + \frac{21}{5}$

LCM of 2, 3, 5 is 30

$$= \frac{165+70+126}{30} = \frac{361}{30} = 12\frac{1}{30}$$

$$\begin{array}{r} 2 \overline{) 20, 40} \\ \underline{10} \\ 10, 20 \\ \underline{2} \\ 1, 1 \end{array}$$

$$\begin{array}{r} 40 \overline{) 57} (1 \\ \underline{-40} \\ 17 \end{array}$$

$$\begin{array}{r} 3 \overline{) 11, 9, 3} \\ \underline{3} \\ 11, 3, 1 \\ \underline{11} \\ 1, 1, 1 \end{array}$$

$$\begin{array}{r} 2 \overline{) 4, 6, 8} \\ \underline{2} \\ 2, 3, 4 \\ \underline{2} \\ 1, 3, 2 \\ \underline{3} \\ 1, 1, 1 \end{array}$$

$$\begin{array}{r} 60 \overline{) 1123} (18 \\ \underline{-60} \\ 523 \\ \underline{-480} \\ 43 \end{array}$$

$$\begin{array}{r} 3 \overline{) 3, 15, 20} \\ \underline{5} \\ 1, 5, 20 \\ \underline{4} \\ 1, 1, 4 \\ \underline{1} \\ 1, 1, 1 \end{array}$$

$$\begin{array}{r} 2 \overline{) 2, 3, 4} \\ \underline{2} \\ 1, 3, 2 \\ \underline{3} \\ 1, 3, 1 \\ \underline{1} \\ 1, 1, 1 \end{array}$$

$$(j) \quad 5\frac{11}{18} - 2\frac{7}{12} + 1\frac{2}{3} = \frac{101}{18} - \frac{31}{12} + \frac{5}{3}$$

$$\text{LCM of 18, 12, 3 is 36} = \frac{202 - 93 + 60}{36} = \frac{169}{36} = 4\frac{25}{36}$$

$$\begin{array}{r|l} 3 & 18, 12, 3 \\ \hline 2 & 6, 4, 1 \\ \hline 2 & 3, 2, 1 \\ \hline 3 & 3, 1, 1 \\ \hline & 1, 1, 1 \end{array}$$

4. Time spent in painting an aeroplane = $\frac{1}{3}$ hrs

$$\text{Time spent in polishing shoes} = \frac{1}{6} \text{ hr}$$

$$\text{Total time spent altogether} = \frac{1}{3} + \frac{1}{6}$$

$$\text{LCM of 3 and 6 is 6} = \frac{2+1}{6} = \frac{3}{6} = \frac{1}{2} \text{ hr}$$

5. Total weight of three bags = $2\frac{1}{4} + 5\frac{2}{3} + 1\frac{1}{10} = \frac{9}{4} + \frac{17}{3} + \frac{11}{10}$

$$\text{LCM of 4, 3, 10 is 60} = \frac{135 + 340 + 66}{60} = \frac{541}{60} = 9\frac{1}{60} \text{ kg}$$

$$\begin{array}{r|l} 2 & 3, 4, 10 \\ \hline 2 & 3, 2, 5 \\ \hline 3 & 3, 1, 5 \\ \hline 5 & 1, 1, 5 \\ \hline & 1, 1, 1 \end{array}$$

6. Length of curtain he need to stitch = $9\frac{1}{7} - 8\frac{3}{15} = \frac{64}{7} - \frac{123}{15}$

$$\text{LCM of 7 and 15 is 105} = \frac{960 - 861}{105} = \frac{99}{105} = \frac{33}{35} \text{ m}$$

7. Total quantity of rice = 100 kg

$$\text{Quantity of rice sold on first day} = 15\frac{3}{4} \text{ kg}$$

$$\text{Quantity of rice sold on second day} = 25\frac{1}{2} \text{ kg}$$

$$\begin{aligned} \text{Quantity of rice left} &= 100 - \left(15\frac{3}{4} + 25\frac{1}{2}\right) \\ &= 100 - \left(\frac{63}{4} + \frac{51}{2}\right) = 100 - \left(\frac{63 + 102}{4}\right) \\ &= 100 - \frac{165}{4} = \frac{400 - 165}{4} = \frac{235}{4} = 58\frac{3}{4} \text{ kg} \end{aligned}$$

8. Length of Ribbon bought by Rita = $5\frac{1}{3} \text{ cm} = \frac{16}{3} \text{ cm}$

$$\text{Length of Ribben bought by Meene} = 8\frac{1}{7} \text{ cm} = \frac{57}{7} \text{ cm}$$

LCM of 3 and 7 is 21

$$\text{Rita's Ribbon} \quad \frac{16}{3} \times \frac{7}{7} = \frac{112}{21}$$

$$\text{Meena Ribbon} = \frac{57}{7} \times \frac{3}{3} = \frac{171}{21}$$

∴ Meen's Ribbon is longer than Rita's Ribbon.

$$\text{Difference between length} = \frac{171}{21} - \frac{112}{21} = \frac{59}{21} \text{ cm}$$

$$\text{Total length of the ribbon} = \frac{112}{21} + \frac{171}{21} = \frac{283}{21} = 13\frac{10}{21} \text{ cm}$$

9. Total distance = $10\frac{1}{2} \text{ km} = \frac{21}{2} \text{ km}$

$$\text{Distance covered by cycle} = 5\frac{2}{3} \text{ km} = \frac{17}{3} \text{ km}$$

$$\text{Distance covered by boat} = 1\frac{7}{11} \text{ km} = \frac{18}{11} \text{ km}$$

$$\begin{aligned} \text{Distance covered on foot} &= \frac{21}{2} - \left(\frac{17}{3} + \frac{18}{11} \right) \\ &= \frac{21}{2} - \left(\frac{187 + 54}{33} \right) \text{ LCM of 3 and 11 is 33} \\ &= \frac{21}{2} - \frac{241}{33} = \frac{693 - 482}{66} \text{ (LCM of 2 and 33 is 66)} \\ &= \frac{211}{66} = 2\frac{13}{66} \text{ km} \end{aligned}$$

10. Unshaded part = $1 - \frac{4}{27} = \frac{27 - 4}{27} = \frac{23}{27}$

Exercise 6.4

1. (a) $\frac{11}{15} \times 4 = \frac{44}{15}$ (b) $\frac{15}{20} \times \frac{3}{7} = \frac{9}{28}$ (c) $\frac{21}{25} \times \frac{48}{56} = \frac{18}{25}$

2. (a) $\frac{6}{8} \div \frac{9}{10} = \frac{6}{8} \times \frac{10}{9} = \frac{5}{6}$ (b) $\frac{12}{20} \div 8 = \frac{12}{20} \times \frac{1}{8} = \frac{3}{40}$

(c) $2\frac{3}{5} \div \frac{10}{15} = \frac{13}{5} \times \frac{15}{10} = \frac{39}{10}$

Exercise 7.1

1. $36 \div 6 + 20 - 25 = 6 + 20 - 25 = 26 - 25 = 1$
2. $20 \times 5 \div 5 + 15 = 20 \times 1 + 15 = 20 + 15 = 35$
3. $48 \div (16 - \overline{4+4}) = 48 \div (16 - 8) = 48 \div 8 = 6$
4. $-24 + \{16 \div (18 - \overline{11+5})\} = -24 + \{16 \div (18 - 16)\} = -24 + \{16 \div 2\}$
 $= -24 + 8 = -16$
5. $6 + [16 - \{21 + 3 - (9 \times 5 - 3 \times 5)\}] = 6 + [16 - \{21 + 3 - (45 - 15)\}]$
 $= 6 + [16 - \{21 + 3 - (45 - 15)\}] = 6 + [16 - \{24 - 30\}]$
 $= 6 + [16 - (-6)] = 6 + [16 + 6] = 6 + 22 = 28$
6. $(-20)[\{(-20) + (-15)\} \times (4) - (8 - 9)(-10)]$
 $= -20[\{-20 - 15\} \times 4 - (-1)(-10)] = -20[-35 \times 4 - 10] = -20[-140 - 10]$
 $= -20[-150] = 3000$
7. $50 + [6 - 8 - \{8(5 - 4 - 1)\}] = 50 + [6 - 8 - \{8 \times 0\}] = 50 + [6 - 8 - 0]$
 $= 50 + [-2] = 50 - 2 = 48$
8. $20 - (8 + 3) \times (-2) = 20 - 11 \times (-2) = 20 + 22 = 42$
9. $70 - 42 \div 2 \times 6 = 70 - 21 \times 6 = 70 - 126 = -56$
10. $15 + 9 \div 3 - [5 \times 3 - \{5 - (7 - 4)\}]$
 $= 15 + 3 - [15 - \{5 - 3\}] = 18 - [15 - 2] = 18 - 13 = 5$
11. $4 \frac{4}{5} \div \frac{3}{5}$ of $5 + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} = \frac{24}{5} \div \frac{3}{5} \times 5 + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} = \frac{8}{5} + \frac{6}{25} - \frac{1}{5}$
 LCM of 5 and 25 is 25 $= \frac{40 + 6 - 5}{25} = \frac{41}{25}$
12. $5 \frac{1}{7} - \left\{ 3 \frac{3}{10} \div \left(2 \frac{4}{5} - \frac{7}{10} \right) \right\} = \frac{36}{7} - \left\{ \frac{33}{10} \div \left(\frac{14}{5} - \frac{7}{10} \right) \right\}$
 $= \frac{36}{7} - \left\{ \frac{33}{10} \div \left(\frac{28-7}{10} \right) \right\} = \frac{36}{7} - \left\{ \frac{33}{10} \div \frac{21}{10} \right\} = \frac{36}{7} - \left\{ \frac{33}{10} \times \frac{10}{21} \right\}$
 $= \frac{36}{7} - \frac{11}{7} = \frac{25}{7}$
13. $5 \frac{1}{2}$ of $\left(\frac{2}{3} - \frac{3}{5} \right) + \frac{1}{2} \div \frac{5}{11} = \frac{11}{2}$ of $\left(\frac{10-9}{15} \right) + \frac{1}{2} \times \frac{11}{5}$
 $= \frac{11}{2} \times \frac{1}{15} + \frac{1}{2} \times \frac{11}{5} = \frac{11}{30} + \frac{11}{10} = \frac{11+33}{30} = \frac{44}{30} = \frac{22}{15}$
14. $7 \frac{1}{2} - \left[2 \frac{1}{4} \div \left\{ 1 \frac{1}{4} \div \frac{1}{2} \left(\frac{3}{2} - \frac{1}{3} - \frac{1}{6} \right) \right\} \right]$

$$\begin{aligned}
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} \div \frac{1}{2} \left(\frac{3}{2} - \left(\frac{2-1}{6} \right) \right) \right\} \right] = \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} \div \frac{1}{2} \left(\frac{3}{2} - \frac{1}{6} \right) \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} \div \frac{1}{2} \left(\frac{9-1}{6} \right) \right\} \right] = \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} \div \frac{1}{2} \times \frac{8}{6} \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} \times \frac{3}{2} \right\} \right] = \frac{15}{2} - \left[\frac{9}{4} \div \frac{15}{8} \right] = \frac{15}{2} - \left[\frac{9}{4} \times \frac{82}{155} \right] = \frac{15}{2} - \frac{6}{5} \\
&= \frac{75-12}{10} = \frac{63}{10}
\end{aligned}$$

$$\begin{aligned}
15. \quad 9\frac{3}{4} \div \left[2\frac{1}{6} + \left\{ 4\frac{1}{3} - \left(1\frac{1}{2} + 1\frac{3}{4} \right) \right\} \right] &= \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{13}{3} - \left(\frac{3}{2} + \frac{7}{4} \right) \right\} \right] \\
&= \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{13}{3} - \left(\frac{6+7}{4} \right) \right\} \right] = \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{52-39}{12} \right\} \right] \\
&= \frac{39}{4} \div \left[\frac{13}{6} + \frac{13}{12} \right] = \frac{39}{4} \div \frac{39}{12} = \frac{39}{4} \times \frac{123}{391} = 3
\end{aligned}$$

Exercise 8.1

- $17 - 27 = 10 + 7 + \frac{2}{10} + \frac{7}{100}$
 - $71.264 = 70 + 1 + \frac{2}{10} + \frac{6}{100} + \frac{4}{1000}$
 - $963.121 = 900 + 60 + 3 + \frac{1}{10} + \frac{2}{100} + \frac{1}{1000}$
 - $3.743 = 3 + \frac{7}{10} + \frac{4}{100} + \frac{3}{1000}$
- 348.05
 - 15.79
 - 4.721
 - 5000.007
- (a) and (b) are like decimals because they have the same number of decimal places.
- (a) < (b) > (c) < (d) < (e) = (f) >

Exercise 8.2

- $\frac{7}{1}$
 - $145.60 = \frac{14560}{100} = \frac{728}{5}$
 - $3150 = \frac{3150}{1000} = \frac{63}{20}$
 - $9.467 = \frac{9467}{1000}$
 - $50.20 = \frac{5020}{100} = \frac{251}{5}$
 - $5.123 = \frac{5123}{1000}$

$$(g) 100.53 = \frac{10053}{100}$$

$$(h) 6.05 = \frac{605}{100} = \frac{121}{20}$$

$$2. (a) \frac{17}{10} = 1.7$$

$$(b) \frac{7}{100} = 0.07$$

$$(c) \frac{151}{1000} = 0.151$$

$$(d) 2\frac{7}{100} = \frac{207}{100} = 2.07$$

$$(e) \frac{193}{100} = 1.93$$

$$3. (a) \frac{7}{5} \quad \therefore \quad \frac{7}{5} = 1.4$$

$$(b) \frac{27}{6} \quad \therefore \quad \frac{27}{6} = 4.5$$

$$(c) \frac{276}{56} = \frac{69}{14} \quad \therefore \quad \frac{276}{56} = 4.92$$

$$(d) 15\frac{5}{12} = \frac{185}{12}$$

$$\therefore \frac{185}{12} = 15.416$$

$$(e) \frac{149}{6}$$

$$\therefore \frac{149}{6} = 24.83$$

$$4. (a) 20.12 = \frac{2012}{100}$$

$$(b) 100.03 = \frac{10003}{100}$$

$$(c) 125.10 = \frac{12510}{100}$$

$$(d) 35.73 = \frac{3573}{100}$$

$$\begin{array}{r} 5 \overline{)7.0} (1.4 \\ \underline{-5} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

$$\begin{array}{r} 6 \overline{)27.0} (4.5 \\ \underline{-24} \\ 30 \\ \underline{-30} \\ 0 \end{array}$$

$$\begin{array}{r} 14 \overline{)69.000} (4.92 \\ \underline{-56} \\ 130 \\ \underline{-126} \\ 40 \\ \underline{-28} \\ 120 \end{array}$$

$$\begin{array}{r} 14 \overline{)185.000} (13.214 \\ \underline{-12} \\ 65 \\ \underline{-60} \\ 50 \\ \underline{-48} \\ 20 \\ \underline{-12} \\ 80 \\ \underline{-72} \\ 8 \end{array}$$

$$\begin{array}{r} 14 \overline{)149.00} (10.643 \\ \underline{-12} \\ 29 \\ \underline{-24} \\ 50 \\ \underline{-48} \\ 20 \\ \underline{-18} \\ 2 \end{array}$$

Exercise 8.3

$$1. (a) 7.056 + 3.14$$

$$\begin{array}{r} 7.056 \\ + 3.140 \\ \hline 10.196 \end{array}$$

$$(b) 17.640 + 0.364$$

$$\begin{array}{r} 17.640 \\ + 0.364 \\ \hline 18.004 \end{array}$$

$$(c) 34.641 + 1.714$$

$$\begin{array}{r} 34.641 \\ + 1.714 \\ \hline 36.355 \end{array}$$

$$(d) 2006.54 + 0.46$$

$$\begin{array}{r} 2006.54 \\ + 0.46 \\ \hline 2007.00 \end{array}$$

(e) $16.5 + 26.47 + 3.9$

$$\begin{array}{r} 16.50 \\ 26.47 \\ + 3.90 \\ \hline 46.87 \end{array}$$

2. (a) $7.640 - 3.419$ (b) $750.05 - 649.98$ (c) $108.032 - 86.8$

$$\begin{array}{r} 7.640 \\ + 3.419 \\ \hline 4.221 \end{array} \quad \begin{array}{r} 750.05 \\ - 649.98 \\ \hline 100.07 \end{array} \quad \begin{array}{r} 108.032 \\ - 86.800 \\ \hline 21.232 \end{array}$$

(d) $1005.06 - 675.059$ (e) $700.070 - 89.495$

$$\begin{array}{r} 1005.060 \\ - 675.059 \\ \hline 330.001 \end{array} \quad \begin{array}{r} 700.070 \\ - 89.495 \\ \hline 610.575 \end{array}$$

3. (a) ₹5.60 (b) 7.576 km (c) 97.245 kg

4. (a) ₹45.65 + ₹10.45 (b) (c)

$$\begin{array}{r} 45.65 \\ + 10.45 \\ \hline 56.10 \end{array} \quad \begin{array}{r} 27.105 \\ + 10.675 \\ \hline 37.780 \end{array} \quad \begin{array}{r} 105.217 \\ + 17.960 \\ \hline 123.177 \end{array}$$

₹56.10 133 km 180 m 123 kg 177g

5. (a) $107.076 - 88.749$ (b) $99.105 - 67.576$ (c) $97.50 - 67.75$

$$\begin{array}{r} 107.076 \\ - 88.749 \\ \hline 18.327 \end{array} \quad \begin{array}{r} 99.105 \\ - 67.576 \\ \hline 31.529 \end{array} \quad \begin{array}{r} 97.50 \\ - 67.75 \\ \hline 29.75 \end{array}$$

18 km 327 m 31 kg 529 g ₹29.75 or ₹29 and 75 paise

6. Total distance travelled = 1000 km.
 Distance travelled by train = 512 km 675 m
 Distance travelled by car = 1000 - 512 km 675 m.

$$\begin{array}{r} 1009.000 \\ - 512.675 \\ \hline 487.325 \end{array}$$

Thus distance travelled by car is 487 km 325 m

7. $100 \text{ kg} - 67 \text{ kg } 657 \text{ g}$ $32 \text{ kg } 343 \text{ g}$

$$\begin{array}{r} 100.000 \\ - 67.657 \\ \hline 32.343 \end{array}$$

8. Total money with sumit = ₹500
 Money spent = ₹97.50
 Money left = ₹500 - ₹97.50

$$\begin{array}{r} 500.00 \\ - 97.50 \\ \hline 402.50 \end{array}$$

Thus, money left with Sumit was ₹402.50

Exercise 9.1

1. (a) $2, \overset{+3}{\underbrace{5}}, \overset{+5}{\underbrace{10}}, \overset{+7}{\underbrace{17}}, \overset{+9}{\underbrace{26}}, \overset{+11}{\underbrace{37}}, \overset{+13}{\underbrace{50}}$
- (b) $3, \overset{\times 3}{\underbrace{9}}, \overset{\times 3}{\underbrace{27}}, \overset{\times 3}{\underbrace{81}}, \overset{\times 3}{\underbrace{234}}, \overset{\times 3}{\underbrace{729}}, \overset{\times 3}{\underbrace{2187}}$
- (c) $1, \overset{+3}{\underbrace{4}}, \overset{+3}{\underbrace{7}}, \overset{+3}{\underbrace{10}}, \overset{+3}{\underbrace{13}}, \overset{+3}{\underbrace{16}}, \overset{+3}{\underbrace{19}}$
- (d) $3, \overset{3 \times 3}{\underbrace{9}}, \overset{3 \times 5}{\underbrace{15}}, \overset{3 \times 7}{\underbrace{21}}, \overset{3 \times 9}{\underbrace{27}}, \overset{3 \times 11}{\underbrace{33}}, \overset{3 \times 13}{\underbrace{39}}$

2. (a) 2, 4, 6, 8
 General rule = Multiple of 2
 nth term = $2n$
 100th term = $2 \times 100 = 200$
- (b) 1, 5, 9, 13
 General rule = Add 4
 nth term = $4n - 3$
 100th term = $397 (4 \times 100 - 3)$
- (c) 1, 4, 9, 16
 General rule = n^2 or square of n
 nth term = n^2
 100th term = $(100)^2 = 10000$
- (d) 5, 10, 15, 20
 General Rule = Multiple of 5
 nth term = $5n$
 100th term = $5 \times 100 = 500$

3. $n = 5m - 2$

m	2	13	25	75
n	$5 \times 2 - 2$ $= 10 - 2 = 8$	$= 5 \times 13 - 2$ $= 65 - 2 = 63$	$25 \times 5 - 2$ $125 - 2 = 123$	$5 \times 75 - 2$ $375 - 2 = 373$

Exercise 9.2

1. (a) $3x = 15$ (b) $p = 49$ (c) $A = l \times b$ (d) $12 - 7x$ (e) $9x + 4y$
2. (a) $2x + y$ Terms $2x, y$
 (b) $5x^2 + 7xy + y^2$ Terms $5x^2, 7xy, y^2$

- (c) $x + 2y - z + 6$ Terms $x, 2y, -z, 6$
 (d) $2ab + 3ab^2 - 7d$ Terms $2ab, 3ab^2, -7d$
3. (a) Binomial (b) Trinomial (c) Monomial
 (d) Trinomial (e) Binomial
4. (a) Like (b) Unlike (c) Unlike (d) Unlike
5. (a) Base = x Exponent = 2
 (b) Base = y Exponent = -4
 (c) Base = $(-xy)$ Exponent 2
 (d) Base = $-a$ Exponent = 5
 (e) Base = y Exponent = 7
6. (a) $a + b - c = 5 + 4 - (-5) = 5 + 4 + 5 = 14$
 (b) $4a^2 + 5b - c = 4 \times (2)^2 + 5 \times 3 - 5 = 4 \times 4 + 15 - 5 = 16 + 10 = 26$

Exercise 9.3

1. Let the breadth of the rectangular hall = 6 m
 Length of rectangular hall = $4b - 5$
2. total distance travelled by Karan = $4x + 3y + 7z$
3. Total money with Shikha = ₹ $(5x + 7y)$
4. Height of box = x cm
 Length of box = $5x$ cm
 Breadth of box = $5x - 5$ cm
5. (a) $x + y = 25$ (b) $x + y = y + 3$
 (c) $x - \frac{1}{x} = 5$ (d) $x \times x = x + 15$

Exercise 9.4

1. $5x + 3 = 20$

Value of x	LHS	RHS
1/5	$5 \times \frac{1}{5} + 3 = 4$	20
2/5	$5 \times \frac{2}{5} + 3 = 5$	20
3/5	$5 \times \frac{3}{5} + 3 = 9$	20
4/5	$5 \times \frac{4}{5} + 3 = 7$	20

5/5	$5 \times \frac{5}{5} + 3 = 8$	20
17/5	$5 \times \frac{17}{5} + 3 = 20$	20

So, $x = \frac{17}{5}$

2. $5x - 3 = 22$

Value of x	LHS	RHS
1	$5 \times 1 - 3 = 2$	22
2	$5 \times 2 - 3 = 7$	22
3	$5 \times 3 - 3 = 12$	22
4	$5 \times 4 - 3 = 17$	22
5	$5 \times 5 - 3 = 22$	22

$\therefore x = 5$

3. (a) $x + 7 = 18$

Add -7 on both sides $x + 7 - 7 = 18 - 7$; $x = 11$

Verification

Put $x = 11$ LHS = $11 + 7 = 18$ RHS = 18

LHS = RHS

(b) $7q = 147$

Multiply both sides by $\frac{1}{7}$; $7q \times \frac{1}{7} = 147 \times \frac{1}{7}$

Verification

Put $2q = 21$ LHS = $7 \times 21 = 147$ RHS = 147

LHS = RHS $q = 21$

(c) $3a = 126$

Multiply both sides by $\frac{1}{3}$

$3 \times a \times \frac{1}{3} = 126 \times \frac{1}{3}$ $a = 43$

Verification

LHS = $3 \times 43 = 126$ RHS = 126 LHS = RHS

(d) $x - 7 = 32$

Add 7 on both sides

$$x - 7 + 7 = 32 + 7; x = 39$$

Verification

$$\text{LHS} = 39 - 7 = 32 \quad \text{RHS} = 32 \quad \text{LHS} = \text{RHS}$$

4. (a) $7 - x = 2$

Add -7 on both sides

$$7 - x - 7 = 2 - 7; -x = -5 \quad x = 5$$

Verification

$$\text{LHS} = 7 - 5 = 2 \quad \text{RHS} = 2 \quad \text{LHS} = \text{RHS}$$

(b) $x - 8 = 25$

$$\text{Add } 8 \text{ on both sides} \quad x - 8 + 8 = 25 + 8 \quad x = 33$$

Verification

$$\text{LHS} = 33 - 8 = 25 \quad \text{RHS} = 25 \quad \text{LHS} = \text{RHS}$$

(c) $4x = -20$

$$\text{Multiply both sides by } \frac{1}{4} \quad 4 \times x \times \frac{1}{4} = -20 \times \frac{1}{4} \quad x = -5$$

Verification

$$\text{LHS } 4 \times (-5) = -20 \quad \text{RHS} = -20 \quad \text{LHS} = \text{RHS}$$

5. (a) $12x - 11 = x + 22$

$$12x - x = 22 + 11; 11x = 33$$

$$\text{Multiply both sides by } \frac{1}{11}; 11 \times x \times \frac{1}{11} = 33 \times \frac{1}{11}; x = 3$$

Verification-

$$\text{LHS } 12x - 11; 12 \times 3 - 11 = 36 - 11 = 25 \quad \text{RHS} = x + 22 = 3 + 22 = 25 \\ \text{LHS} = \text{RHS}$$

(b) $3(x - 5) = 15; 3x - 15 = 15$

Add 15 on both sides

$$3x - 15 + 15 = 15 + 15; 3x = 30$$

$$\text{Multiply both sides by } \frac{1}{3}; 3 \times x \times \frac{1}{3} = 30 \times \frac{1}{3}; x = 10$$

Verification

$$\text{LHS } 3(x - 5) = 3(10 - 5) = 3 \times 5 = 15$$

$$\text{RHS} = 15 \quad \text{LHS} = \text{RHS}$$

(c) $7(x - 4) = x + 8; 7x - 28 = x + 8; 7x - x = 8 + 28; 6x = 36$

Multiply both sides by $\frac{1}{6}$; $6 \times x \times \frac{1}{6} = 36 \times \frac{1}{6}$; $x = 6$

Verification

$$\text{LHS} = 7(x - 4) = 7(6 - 4) = 7 \times 2 = 14$$

$$\text{RHS } x + 8 = 6 + 8 = 14$$

Exercise 9.5

1. Let the number be x

Acc. to question $\frac{x}{9} = 7$

Multiply both sides by 9

$$\frac{x}{9} \times 9 = 7 \times 9; \quad x = 63$$

2. Let the number be x

Acc. to question, $5x - 9 = 26$

Add 9 on both sides

$$5x - 9 + 9 = 26 + 9; \quad 5x = 35$$

Multiply both sides by $\frac{1}{5}$

$$5 \times x \times \frac{1}{5} = 35 \times \frac{1}{5}; \quad x = 7$$

3. $\frac{1}{3}x + 4 = 27$

Subtract 4 from both sides

$$\frac{1}{3}x + 4 - 4 = 27 - 4; \quad \frac{1}{3}x = 23$$

Multiply both sides by 3

$$\frac{1}{3} \times x \times 3 = 23 \times 3; \quad x = 69$$

4. $\frac{1}{4}x = 4 = 8$

Add 4 on both sides

$$\frac{1}{4}x - 4 + 4 = 8 + 4; \quad \frac{1}{4}x = 12$$

Multiply both sides by 4

$$\frac{1}{4} \times x \times 4 = 12 \times 4; \quad x = 48$$

Exercise 10.1

1. (a) $6x = 30$ (b) $x + 5 = 68$
(c) $x - 7 = 6$ (d) $4x + 7 = 15$
(e) $19 - 3x = 7$ (f) $4x - 3 = 17$
(g) $3x - 5 = 8$ (h) $\frac{1}{3}x + 5 = 8$
(i) $4x = 36$ (j) $\frac{y}{5} = 4$

2. (a) $7x = 28$

x	LHS ($7x$)	RHS (28)
1	$7 \times 1 = 7$	28
2	$7 \times 2 = 14$	28
3	$7 \times 3 = 21$	28
4	$7 \times 4 = 28$	28

$\therefore x = 8$

- (b) $z - 3 = 2z - 5$

Z	LHS ($z - 3$)	RHS ($2z - 5$)
1	$1 - 3 = -2$	$2 \times 1 - 5 = -3$
2	$2 - 3 = -1$	$2 \times 2 - 5 = -1$

$\therefore z = 2$

- (c) $2y + 5 = 3y$

y	($2y + 5$) LHS	3y RHS
1	$2 \times 1 + 5 = 8$	$3 \times 1 = 3$
2	$2 \times 2 + 5 = 9$	$3 \times 2 = 6$
3	$2 \times 3 + 5 = 11$	$3 \times 3 = 9$
4	$2 \times 4 + 5 = 13$	$3 \times 4 = 12$
5	$2 \times 5 + 5 = 15$	$3 \times 5 = 15$

$\therefore y = 5$

- (d) $3y = 24$

y	LHS ($3y$)	RHS (24)
1	$3 \times 1 = 3$	24
2	$3 \times 2 = 6$	24

3	$3 \times 3 = 9$	24
4	$3 \times 4 = 12$	24
5	$3 \times 5 = 15$	24
6	$3 \times 6 = 18$	24
7	$3 \times 7 = 21$	24
8	$3 \times 8 = 24$	24

$$\therefore y = 8$$

(e) $x + 5 = 12$

x	LHS ($x + 5$)	RHS (12)
1	$1 + 5 = 6$	12
2	$2 + 5 = 7$	12
3	$3 + 5 = 8$	12
4	$4 + 5 = 9$	12
5	$5 + 5 = 10$	12
6	$6 + 5 = 11$	12
7	$7 + 5 = 12$	12
8	$3 \times 8 = 24$	12

$$\therefore x = 7$$

(f) $2x - 5 = 13$

x	LHS ($2x - 5$)	RHS(13)
1	$2 \times 1 - 5 = -3$	13
2	$2 \times 2 - 5 = -1$	13
3	$2 \times 3 - 5 = 1$	13
4	$2 \times 4 - 5 = 3$	13
5	$2 \times 5 - 5 = 5$	13
6	$2 \times 6 - 5 = 7$	13
7	$2 \times 7 - 5 = 9$	13
8	$2 \times 8 - 5 = 11$	13
9	$2 \times 9 - 5 = 13$	13

$$\therefore x = 9$$

3. (a) $5x - 17 = x - 1$

Putting value of $x = 4$ on both sides

$$5 \times 4 - 17 = 4 - 1; 20 - 17 = 3; 3 = 3 \quad \text{LHS} = \text{RHS}$$

(b) $3x + 12 = 21$

Putting value of $x = 3$ on both sides

$$3 \times 3 + 12 = 21; 9 + 12 = 21; 21 = 21 \quad \text{LHS} = \text{RHS}$$

(c) $\frac{1}{3}y + 5 = 8$

Putting $y = 9$ on both sides

$$\frac{1}{3} \times 9 + 5 = 8; 3 + 5 = 8; 8 = 8 \quad \text{LHS} = \text{RHS}$$

(d) $6x + 5 = 2x + 17$

Putting value of $x = 3$ on both sides

$$6 \times 3 + 5 = 2 \times 3 + 17; 18 + 5 = 6 + 17; 23 = 23 \quad \text{LHS} = \text{RHS}$$

Exercise 10.2

1. $4y + 7 = 15; 4y = 15 - 7; 4y = 8; y = \frac{8}{4} = 2$

Check LHS $4y + 7 = 4 \times 2 + 7 = 8 + 7 = 15 \quad \text{RHS} = 15$

LHS = RHS Hence Verified

2. $k - 24 = -50; k = -50 + 24; k = -26$

Check LHS $k - 24 = -26 - 24 = -50$

RHS = -50

LHS = RHS

Hence Verified

3. $2y - \frac{1}{2} = 3; 2y = 3 + \frac{1}{2}; 2y = \frac{6+1}{2}; 2y = \frac{7}{2}; y = \frac{7}{2} \times \frac{1}{2} = \frac{7}{4}$

Check LHS $2y - \frac{1}{2} = 2 \times \frac{7}{4} - \frac{1}{2} = \frac{7}{2} - \frac{1}{2} = \frac{6}{2} \quad \text{RHS} = 3$

LHS = RHS Hence verified

4. $y - 2 = -5; y = -5 + 2; y = -3$

Check LHS $y - 2 = -3 - 2 = -5$

RHS = -5

LHS = RHS

Hence verified

5. $\frac{2x}{5} - \frac{3}{2} = \frac{x}{2} + 1$

$$= \frac{2x}{5} - \frac{x}{2} = 1 + \frac{3}{2} = \frac{4x - 5x}{10} = \frac{2+3}{2} = \frac{-x}{10} = \frac{5}{2} = -x = \frac{5}{2} \times 10$$

$$= -x = 25 = x = -25$$

Verification

$$\text{LHS } \frac{2 \times (-25) - 3}{5} = -10 - \frac{3}{2} = \frac{-20 - 3}{2} = \frac{-23}{2}$$

$$\text{RHS } \frac{-25 + 1}{2} = \frac{-25 + 2}{2} = -\frac{23}{2} \quad \text{LHS} = \text{RHS}$$

Hence verified

6. $3x - 5 = 16$; $3x = 16 + 5$; $3x = 21$; $x = 7$

Check LHS $3x - 5 = 3 \times 7 - 5 = 21 - 5 = 16$ RHS 16

LHS = RHS Hence verified

7. $(2x + 5) = (3x - 7)$

$2x - 3x = -7 - 5$; $-x = -12$; $x = 12$

Check

LHS $2x + 5 = 2 \times 12 + 5 = 24 + 5 = 29$

RHS $3x - 7 = 3 \times 12 - 7 = 36 - 7 = 29$

LHS = RHS Hence verified

8. $3x + 12 = 2(x + 12)$

$3x + 12 = 2x + 24$; $3x - 2x = 24 - 12$; $x = 12$

LHS $3x + 12 = 3 \times 12 + 12 = 36 + 12 = 48$

RHS $2(x + 12) = 2(12 + 12) = 2 \times 24 = 48$

LHS = RHS Hence verified

9. $\frac{5x}{14} = \frac{75}{42}$; $5x = \frac{75}{42} \times 14$; $x = \frac{75}{42} \times \frac{14}{5} = 5$

Check LHS $= \frac{5x}{14} = \frac{5 \times 5}{14} = \frac{25}{14}$

RHS $= \frac{75}{42} = \frac{25}{14} \quad \text{LHS} = \text{RHS}$ Hence verified

10. $3(y + 2) - 2(y - 1) = 7$

$3y + 6 - 2y + 2 = 7$; $y + 8 = 7$; $y = 7 - 8 = -1$

Check

LHS $3(8y + 2) - 2(y - 1) = 3 \times (-1) + 6 - 2(-1 - 1)$
 $= -3 + 6 - 2 \times (-2) = +3 + 4 = 7$

RHS = 7

LHS = RHS

11. $1.2y = 14.4$; $y = \frac{14.4}{1.2} = 12$

Check LHS $1.2y = 1.2 \times 12 = 14.4$

RHS 14.4

LHS = RHS

Hence verified

$$12. \frac{2n}{3} + 8 = \frac{n}{2} - 1 \quad \frac{2n}{3} - \frac{n}{2} = -1 - 8 \quad \frac{4n - 3n}{6} = -9$$

$$\frac{n}{6} = -9 \quad n = -54$$

$$\text{Check LHS } \frac{2 \times (-54)}{3} + 8 = -36 + 8 = -28$$

$$\text{RHS } \frac{54}{27} = -27 - 1 = -28 \quad \text{LHS} = \text{RHS} \quad \text{Hence verified}$$

$$13. m - 7 = 5 + \frac{m}{2} \quad m \frac{m}{2} = 5 + 7 \quad \frac{2m - m}{2} = 12$$

$$\frac{m}{2} = 12 \quad m = 12 \times 2 = 24$$

$$\text{Check LHS } m - 7 = 24 - 7 = 17 \quad \text{RHS } 5 + \frac{m}{2} = 5 + \frac{24}{2} = 5 + 12 = 17$$

$$\text{LHS} = \text{RHS} \quad \text{Hence verified}$$

$$14. 7(5x - 4) + 3(x + 2) = 85$$

$$\Rightarrow 35x - 28 + 3x + 6 = 85 \quad \Rightarrow 38x - 22 = 85$$

$$\Rightarrow 38x = 85 + 22 \quad \Rightarrow 38x = 107$$

$$x = \frac{107}{38}$$

$$\begin{aligned} \text{Check LHS} &= 7\left(5 \times \frac{107}{38} - 4\right) + 3\left(\frac{107}{38} + 2\right) \\ &= 7\left(\frac{535}{38} - 4\right) + 3\left(\frac{107 + 76}{38}\right) = 7\left(\frac{535 - 152}{38}\right) + 3\left(\frac{183}{38}\right) \\ &= 7 \times \frac{383}{38} + \frac{549}{38} = \frac{2681}{38} + \frac{549}{38} = \frac{3230}{38} = 85 \end{aligned}$$

$$\text{RHS} = 85$$

$$\text{LHS} = \text{RHS} \text{ Hence verified}$$

$$15. 8(5x - 7) - 2(9x - 18) = 40$$

$$40x - 56 - 18x + 36 = 40$$

$$22x - 20 = 40; 22x = 40 + 20; 22x = 60$$

$$x = \frac{60}{22} = \frac{30}{11}$$

$$\text{Check LHS } 8(5x - 7) - 2(9x - 18)$$

$$= 8\left(5 \times \frac{30}{11} - 7\right) - 2\left(9 \times \frac{30}{11} - 18\right) = 8\left(\frac{150}{11} - 7\right) - 2\left(\frac{270}{11} - 18\right)$$

$$\begin{aligned}
 &= 8\left(\frac{150-77}{11}\right) - 2\left(\frac{270-198}{11}\right) = 8 \times \frac{73}{11} - 2 \times \frac{72}{11} = \frac{584}{11} - \frac{144}{11} \\
 &= \frac{440}{11} = 40 \quad \text{RHS} = 40 \quad \text{LHS} = \text{RHS}
 \end{aligned}$$

Hence verified.

Exercise 10.3

- $8x = 56;$ $x = \frac{56}{8} = 7$
- Breadth of the rectangular field = x
 Length of the rectangular field = $2x$
 Perimeter = 234 m
 Perimeter of rectangle = $2(l + b)$

$$234 = 2(x + 2x); \quad 234 = 2 \times 3x; \quad 234 = 6x; \quad \frac{234}{6} = x$$

$39 = x$
 \therefore Breadth = 39 m Length = $2 \times 39 = 78$ m
- Let the first number be x
 Second number be $85 - x$

$$85 - x - x = 15; \quad 85 - 2x = 15; \quad 85 - 15 = 2x$$

$$70 = 2x; \quad 35 = x$$

First number = 35
 Second number = $85 - 35 = 50$
- Let the age of sumit = x yrs
 Prateek's age is = $4x$ yrs

$$2(x + 16) = (4x + 16); \quad 2x + 32 = 4x + 16$$

$$2x - 4x = 16 - 32; \quad -2x = -16$$

$$x = \frac{16}{2} = 8$$

\therefore Sumit's age is 8 years
 Prateek's age is $4 \times 8 = 32$ years
- First odd number be x
 Second consecutive odd number be $x + 2$
 According to question
 $x + x + 2 = 32$

$$2x + 2 = 32;$$

$$2x = 32 - 2;$$

$$2x = 30;$$

$$x = \frac{30}{2} = 15$$

∴ First odd number be 15

Second consecutive odd number be $15 + 2 = 17$

6. First even number x

Second consecutive even number be $x + 2$

Third consecutive even number be $x + 4$

According to question

$$x + x + 2 + x + 4 = 108; \quad 3x + 6 = 108; \quad 3x = 108 - 6$$

$$3x = 102; \quad x = \frac{102}{3} = 34$$

∴ First even number = 34

Second consecutive number = $34 + 2 = 36$

Third consecutive number = $34 + 4 = 38$

7. Let the number be x

According to question

$$5x = x + 80; \quad 5x - x = 80; \quad 4x = 80; \quad x = \frac{80}{4} = 20$$

∴ The number is 20.

8. Let Fatima's present age = x years

According to question

$$x + 16 = 3x; \quad 3x - x = 16; \quad 2x = 16$$

$$x = \frac{16}{2} = 8 \text{ years}$$

∴ Fatima's present age was 8 years

9. Let the price of a book = ₹ x

According to question

$$5x = 18 + 3x; \quad 5x - 3x = 18; \quad 2x = 18; \quad x = \frac{18}{2} = ₹9$$

∴ The price of book was ₹9.

10. Let the breadth of a rectangular lawn = x m.

Length of a rectangular lawn = $4x$ m

Perimeter of a lawn 450 m

According to question

$$450 = 2(l + b); \quad 450 = 2(4x + x); \quad 450 = 2(5x)$$

$$450 = 10x; \quad \frac{450}{10} = x; \quad x = 45 \text{ m}$$

\therefore Breadth of the rectangular lawn = 45 m

Length of the rectangular lawn = $4 \times 45 = 180 \text{ m}$

- 11.** Let the breadth of the rectangle = $x \text{ cm}$

Length of the rectangle = $(x + 2) \text{ cm}$

Perimeter = 28 cm

According to question.

$$28 = 2(l + b); \quad 28 = 2(x + x + 2); \quad 28 = 2(2x + 2)$$

$$28 = 4x + 4; \quad 28 - 4 = 4x; \quad 24 = 4x; \quad \frac{24}{4} = x; \quad x = 6 \text{ cm}$$

\therefore Breadth of the rectangle = 6 cm

Length of the rectangle = $6 + 2 = 8 \text{ cm}$

- 12.** Let the first number be x

Other number is $2x$

According to questions

$$x + 2x = 123; \quad 3x = 123; \quad x = \frac{123}{3} = 41$$

\therefore First number is 41

Other number is $2 \times 41 = 82$

- 13.** Let the first consecutive number = x

Second consecutive number = $x + 1$

Third consecutive number = $x + 2$

According to questions

$$x + x + 1 + x + 2 = 48; \quad 3x + 3 = 48; \quad 3x = 48 - 3$$

$$3x = 45; \quad x = \frac{45}{3} = 15$$

\therefore First number is 15

Second number is $15 + 1 = 16$

Third number is $15 + 2 = 17$

- 14.** Let the number of 50 paise coins = x

Number of 25 paise coins = $4x$

According to questions

$$25(4x) + 50x = 300p; \quad 100x + 50x = 3000p$$

$$150x = 3000p; \frac{3000}{150} = 20$$

\therefore 50 paise coins are 20

25 paise coins are $4 \times 20 = 80$

- 15.** Let the number be x

According to question

$$x + 88 = 5x; \quad 5x - x = 88; \quad 4x = 88; \quad 4x = 88; \quad x = \frac{88}{4} = 22$$

\therefore The number is 22

- 16.** Let Ram's Present age = x years

According to questions

$$x + 12 = 5(x - 8); \quad x + 12 = 5x - 40; \quad 5x - x = 12 + 40; \quad 4x = 52; \quad x = \frac{52}{4} = 13$$

\therefore Ram's present age is 13 years

- 17.** Let the present age of Yogesh = x years

Mr's Sehgal's present age is $3x$ years

$$(3x - 3) = 4(x - 3); \quad 3x - 3 = 4x - 12; \quad 4x - 3x = -3 + 12; \quad x = 9 \text{ years}$$

\therefore Present age of Yogesh is 9 years

Present age of Mr. Sehgal is $3 \times 9 = 27$ years

- 18.** Let the age of Nitin be x years

Prachi's age is $x + 27$

According to question

$$x + 27 + 8 = 2(x + 8); \quad x + 35 = 2x + 16; \quad 2x - x = 35 - 16; \quad x = 19 \text{ years}$$

\therefore Nitin's age is 19 years

Prachi's age is $19 + 27 = 46$ years

Exercise 11.1

1. (a) $\frac{42}{35} = 6:5$ (b) $\frac{30}{25} = 6:5$ (c) $\frac{64}{96} = 2:3$

(d) $\frac{38}{25} = 38:25$

- 2.** (a) 2 m to 50 cm

$$1 \text{ m} = 100 \text{ cm}; \quad 2 \text{ m} = 200 \text{ cm}; \quad \frac{200}{50} = 4:1$$

- (b) 200 ml to 1 l

$$1 \text{ l} = 1000 \text{ ml} = \frac{200}{1000} = \frac{1}{5} = 1:5$$

(c) 2 hours to 30 minutes

$$1 \text{ hr} = 60 \text{ minutes}$$

$$2 \text{ hrs} = 2 \times 60 = 120 \text{ minutes}; \frac{120}{30} = 4:1$$

(d) 1 year to 7 months

$$1 \text{ year} = 12 \text{ months}, \frac{12}{7} = 12:7$$

(e) 10 mm to 1 cm

$$1 \text{ cm} = 10 \text{ mm} = \frac{10}{10} = 1:1$$

3. (a) $\frac{3}{10}$ and $\frac{2}{15}$ LCM of 10 and 15 is 30

$$\frac{3}{10} \times \frac{3}{3} = \frac{9}{30}; \frac{2}{15} \times \frac{2}{2} = \frac{4}{30} \quad \therefore \frac{9}{30} > \frac{4}{30}; \text{ Hence } \frac{3}{10} > \frac{2}{15}$$

(b) 3:4 and 51:68

$$\frac{3}{4} \text{ and } \frac{51}{68} \quad \text{LCM of 4 and 68 is 68}$$

$$\frac{3}{4} \times \frac{17}{17} = \frac{51}{68}; \frac{51}{68} \times \frac{1}{1} = \frac{51}{68} \quad \therefore \frac{51}{68} = \frac{51}{68}; \quad \text{Hence } \frac{3}{4} = \frac{51}{68}$$

(c) 6:11 and 9:14

$$\frac{6}{11} \text{ and } \frac{9}{14} \quad \text{LCM of 11 and 14 is 154}$$

$$\frac{6}{11} \times \frac{14}{14} = \frac{84}{154}; \frac{9}{14} \times \frac{11}{11} = \frac{99}{154}; \frac{84}{154} < \frac{99}{154}$$

$$\begin{array}{r|l} 11 & 11, 14 \\ 14 & 1, 14 \\ \hline & 1, 1 \end{array}$$

(d) 3:14 and 9:35 $\frac{3}{14}$ and $\frac{9}{35}$

$$\text{LCM of 14 and 35 is 70}$$

$$\frac{3}{14} \times \frac{5}{5} = \frac{15}{70}; \frac{9}{35} \times \frac{2}{2} = \frac{18}{70} \quad \therefore \frac{15}{70} < \frac{18}{70}$$

$$\text{Hence } \frac{3}{14} < \frac{9}{35}$$

$$\begin{array}{r|l} 7 & 14, 35, \\ 2 & 2, 5 \\ 5 & 1, 5 \\ \hline & 1, 1 \end{array}$$

(e) 5:18 and 7:24

$$\frac{5}{18} \text{ and } \frac{7}{24}$$

$$\text{LCM of 18 and 24 is 72}$$

$$\frac{5}{18} \times \frac{4}{4} = \frac{20}{72}; \frac{7}{24} \times \frac{3}{3} = \frac{21}{72} \quad \therefore \frac{20}{72} < \frac{21}{72}; \text{ Hence } \frac{5}{18} < \frac{7}{24}$$

$$\begin{array}{r|l} 3 & 18, 24 \\ 3 & 6, 8 \\ 2 & 2, 8 \\ 2 & 1, 4 \\ 2 & 1, 2 \\ \hline & 1, 1 \end{array}$$

4. Ratio of boys to girls = 35 : 25

$$\frac{35}{25} = 7 : 5$$

5. Sum of the ratio is $2 + 3 = 5$

$$\text{Ist part} = 120 \times \frac{2}{5} = ₹ 48$$

$$\text{2nd Part} = 120 \times \frac{3}{5} = ₹ 72$$

Exercise 11.2

1. (a) 8 : 14 :: 20 : 36

$$\frac{8}{14} = \frac{4}{7}, \frac{20}{36} = \frac{5}{9} \quad \text{Thus, } \frac{4}{7} \neq \frac{5}{9}$$

So 8 : 14 is not in proportion with 20 : 36

- (b) 20 : 80 :: 4 : 16

$$\frac{20}{80} = \frac{1}{4}, \frac{4}{16} = \frac{1}{4} \quad \text{Thus, } \frac{1}{4} = \frac{1}{4}$$

So, 20 : 80 is in proportion with 4 : 16

- (c) 7 : 35 :: 4 : 20

$$\frac{7}{35} = \frac{1}{5}, \frac{4}{20} = \frac{1}{5} \quad \text{Thus, } \frac{1}{5} = \frac{1}{5}$$

So, 7 : 35 is in proportion with 4 : 20

- (d) 2 : 3 :: 10 : 15

$$\frac{2}{3}, \frac{10}{15} = \frac{2}{3} \quad \text{Thus, } \frac{2}{3} = \frac{2}{3}$$

So, 2 : 3 is in proportion with 10 : 15

2. 45 cm : and 12 cm : 15 cm

$$\frac{45}{60} = \frac{3}{4}, \frac{12}{15} = \frac{4}{5} \quad \text{Thus } \frac{3}{4} \neq \frac{4}{5}$$

So, 45 : 60 is not in proportion with 12 : 15

3. Cost of one pen = ₹ 45

$$\text{Cost of 5 pens} = 5 \times ₹ 45 = ₹ 225$$

Thus, cost of 5 pens was ₹ 225

4. time taken by car to cover 120 km = 6 hrs

$$\text{Time taken by car to cover 1 km} = \frac{6}{120}$$

Time taken by car to cover 450 km = $\frac{6}{120} \times 480 = 24$ hours

Thus, car takes 24 hours to cover 480 km.

5. In 3 days, cow grazes = 10 m^2

In 1 day cow grazes = $\frac{10}{3}$

In 21 days, cow grazes = $\frac{10}{3} \times 21 = 70 \text{ m}^2$

Thus, cow grazes 70 m^2 of area in 21 days.

6. 4 people can finish a work in = 6 days
1 person can finish a work in = $6 \times 4 = 24$ days
12 people can finish a work in = $\frac{24}{12} = 2$ days
7. Number of parcels = $\frac{2100}{35} = 60$ parcels

Exercise 12.1

1. (a) Seven points = A, B, C, D, E, F, G
(b) Eight points = A, B, C, D, E, F, G, H
2. (a) $(l, m); (m, n); (l, n); (q, r)$
(b) $(l, p); (m, p); (n, p); (l, r); (m, r); (n, r); (l, q); (m, q); (n, q)$
(c) m, p (d) l, r (e) m, r (f) l, q
3. (a) ✗ (b) ✗ (c) ✗ (d) ✓ (e) ✗ (f) ✓

Exercise 12.2

1. Open figures = c, e, f, h closed figures = a, b, d, g
2. (a) 8 sides (b) 8 vertices (c) No
(d) No (e) Yes (f) No
3. (a) A, B, C, D, E
(b) $(A, B); (B, C); (C, D); (D, E); (E, A); (B, D); (B, E)$
(c) AB, BC, CD, DE, EA, BD
(d) AB and BC, BC and CD, CD and DE, DE and EA, EA and AB, AB and BD, BD and DE
(e) AD, EB and AC

Exercise 12.3

1. (a) There are 3 angles $\angle A, \angle B$ and $\angle C$
(b) There are 4 angles $\angle A, \angle B, \angle C$ and $\angle D$

- (c) There are 8 angles, $\angle A$, $\angle B$, $\angle C$, $\angle D$, $\angle DAC$, $\angle DCA$, $\angle BAC$, $\angle BCA$
2. (a) $\angle PQR$, $\angle QRS$, $\angle RSP$, $\angle SPQ$
 (b) $\angle EAB$, $\angle ABC$, $\angle BCD$, $\angle CDE$, $\angle DEA$, $\angle EAC$, $\angle CAB$, $\angle DCA$, $\angle ACB$
3. (a) $\angle 1 = \angle ADC$ $\angle 2 = \angle ACD$
 $\angle 3 = \angle DAC$ $\angle 4 = \angle BAC$
 $\angle 5 = \angle CBA$ $\angle 6 = \angle ACB$
- (b) $\angle 1 = \angle AOC$ $\angle 2 = \angle AOD$
 $\angle 3 = \angle DOB$ $\angle 4 = \angle BOC$
4. (a) C, E (b) B (c) A, P, Q

Exercise 12.4

1. (a) Right (b) Acute (c) Right (d) Right
 (e) Obtuse
2. (a) Scalene (b) Isosceles (c) Equilateral (d) Equilateral
 (e) Isosceles (f) Equilateral (g) Scalene
3. (a) Interior = P, Q Exterior = S, R
 On boundary = A, F, T, B, C
- (b) Interior = E, F, G, H Exterior = P, Q
 On boundary = A, R, B, T, C, D, S
4. (a) ABCD is the quadrilateral (b) K, L
 (c) P (d) A, B, C, D, N

Exercise 12.5

1. (a) OD, OC, OA, OB (b) AB, AC, BC, CD (c) CD
2. (a) Radius = $\frac{1}{2} \times \text{Diameter} = \frac{1}{2} \times 12 = 6$ cm
 (b) Radius = $\frac{1}{2} \times \text{diameter} = \frac{1}{2} \times 20 = 10$ cm
 (c) Radius = $\frac{1}{2} \times \text{diameter} = \frac{1}{2} \times 38 = 19$ cm
 (d) Radius = $\frac{1}{2} \times \text{diameter} = \frac{1}{2} \times 28 = 14$ cm
 (e) Radius = $\frac{1}{2} \times \text{diameter} = \frac{1}{2} \times 58 = 29$ cm
3. (a) Diameter = $2 \times \text{Radius} = 2 \times 6 = 12$ cm
 (b) Diameter = $2 \times \text{Radius} = 2 \times 4 \text{ cm} = 8$ cm
 (c) Diameter = $2 \times \text{Radius} = 2 \times 7 = 14$ cm

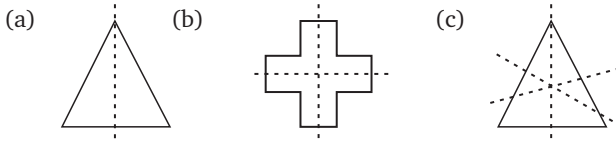
- (d) Diameter = $2 \times \text{Radius} = 2 \times 11 = 22$ cm
 (e) Diameter = $2 \times \text{Radius} = 2 \times 22 = 44$ cm

Exercise 13.1

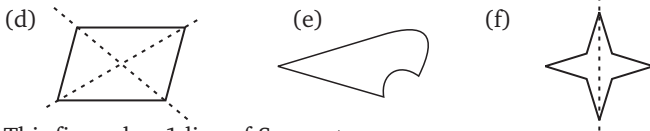
- (a) Cube (b) cylinder (c) cuboid
 (d) sphere (e) cone (f) Sphere
 (g) pyramid (h) cuboid (i) cylinder
- (a) Cube = Dice, Ice-cube, gift box
 (b) Cone = Ice-cream cone, Birthday cap,
 (c) Sphere = Ball, globe, orange
 (d) Cuboid = Pencil box, Door, Eraser
- (a) Cuboid (b) 2d, 3d (c) Vertices, 8 (d) 8, 12, 6 (e) One
 (f) Vertices, triangular base, rectangular lateral faces, edges
 (g) Length, breadth and height

Exercise 14.1

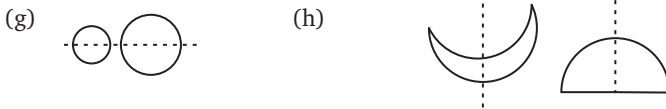
- (a) This figure has one line of symmetry because it is an isosceles triangle.
 (b) This figure has 2 lines of symmetry
 (c) This figure has 3 lines of symmetry because it is an equilateral triangle.



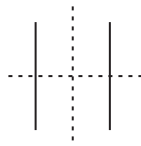
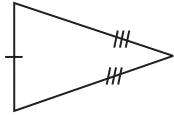
- (d) This figure has 2 lines of symmetry along its diagonals
 (e) No line of symmetry
 (f) this figure has 2 lines of symmetry



- (g) This figure has 1 line of Symmetry
 (h) This figure has 1 line of symmetry

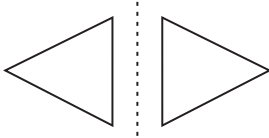


2. (a) This is a semicircle and it has only one line of symmetry.
 (b) No line of symmetry
 (c) It has 2 lines of symmetry
 (d) It has no line of symmetry.

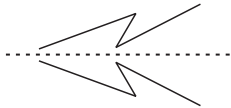


Exercise 14.2

1. (a)



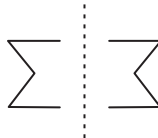
(c)



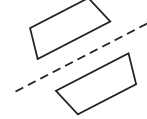
(e)



(b)



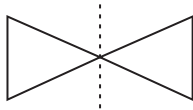
(d)



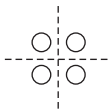
(f)



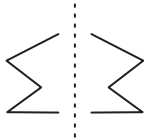
2. (a)



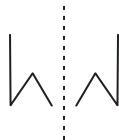
(c)



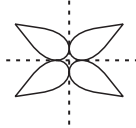
(e)



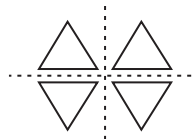
(b)



(d)



(f)



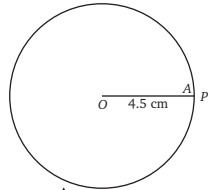
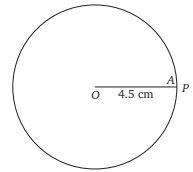
Exercise 15.1

- \overline{PQ} 6 cm
 \overline{AL} 6 cm
- \overline{AB} 6.3 cm \overline{BL}
 \overline{AY} 7.9 cm \overline{YL}
- \overline{PQ}
 \overline{AL} \overline{BL}

Exercise 15.2

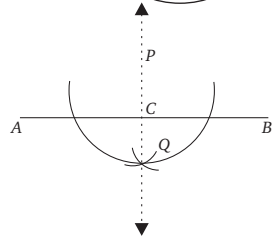
- Radius = $\frac{1}{2} \times$ Diameter = $\frac{1}{2} \times 6 = 3$ cm
- Diameter = $2 \times$ Radius = $2 \times 3.8 = 7.6$ cm
- $OA = 5$ cm
 $OB = 3.5$ cm
 $OC = 2.8$ cm
- Ans. $5.OA = 4.5$ cm

$OP = 5$ cm



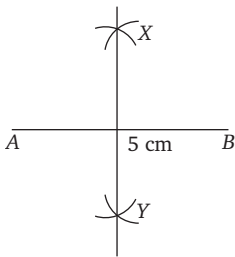
Exercise 15.3

- PQ, BQ, AQ
 - AD, DC, CB, BA
- One
- $PC \perp AB$

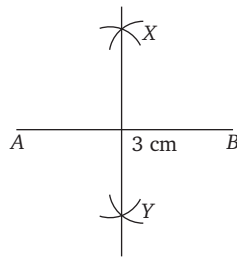


Exercise 15.4

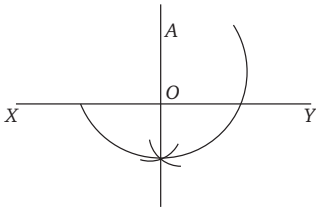
1.



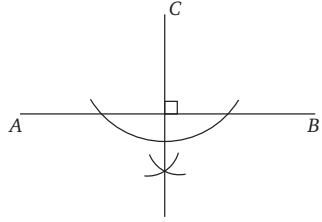
2.



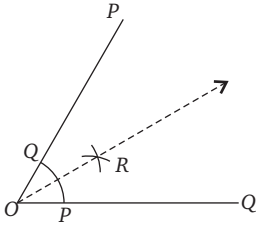
3.



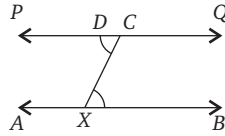
4.



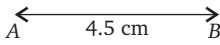
5.



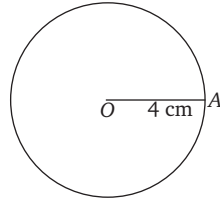
6.



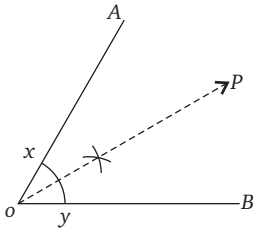
7.



8.

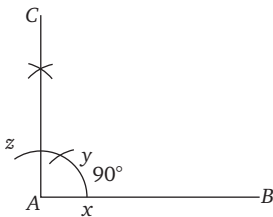


9.

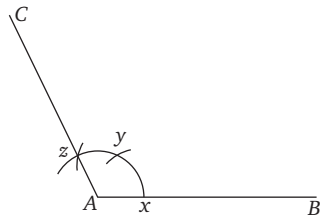


Exercise 15.5

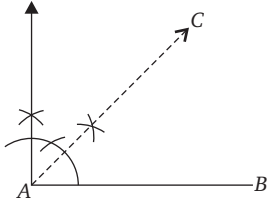
1. (a) $\angle CAB = 90^\circ$



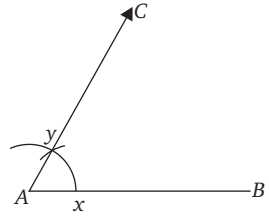
(b) $\angle CAB = 120^\circ$



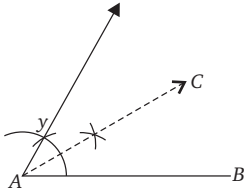
(c) $\angle CAB = 45^\circ$



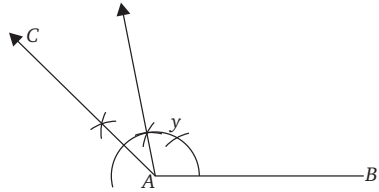
(d) $\angle CAB = 60^\circ$



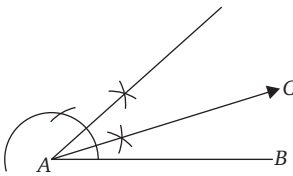
2. $30^\circ \angle BAC = 30^\circ$



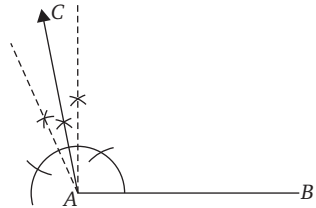
3. $150^\circ \angle CAB = 150^\circ$



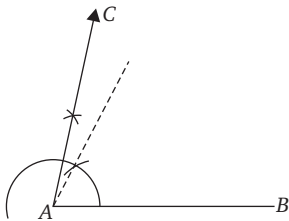
4. (a) $15^\circ \angle CAB = 15^\circ$



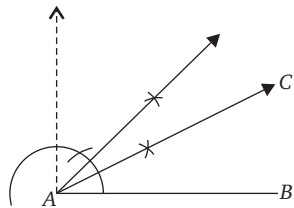
(b) $105^\circ \angle CAB = 105^\circ$



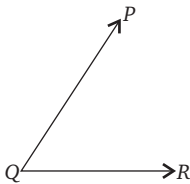
(c) $75^\circ \angle CAB = 75^\circ$



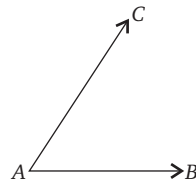
(d) $22\frac{1}{2}^\circ \angle CAB = 22\frac{1}{2}^\circ$



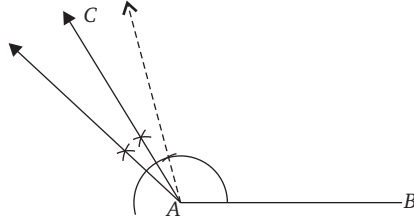
5. $\angle PQR = 60^\circ$



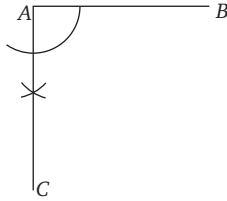
$\angle CAB = 60^\circ$



6. $\angle CAB = 135^\circ$



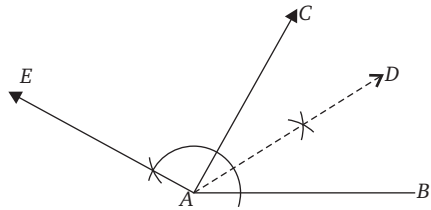
7. $\angle CAB = 270^\circ$



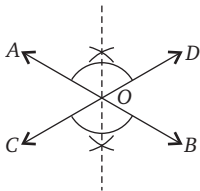
8. $\angle CAB = 84^\circ$

$\angle DAB = 42^\circ$

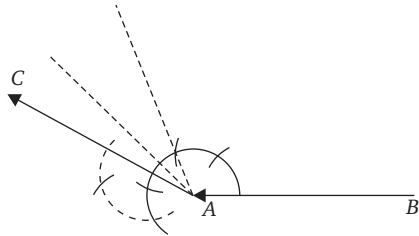
$\angle EAB = 168^\circ$



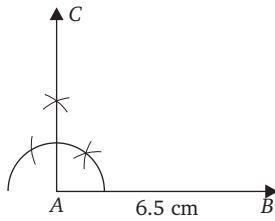
9. $\angle CAB = 165^\circ$



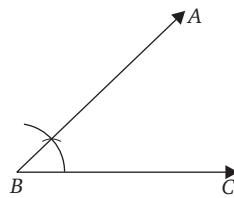
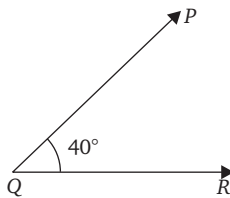
10. $\angle CAB = 165^\circ$



11. $CA \perp AB$

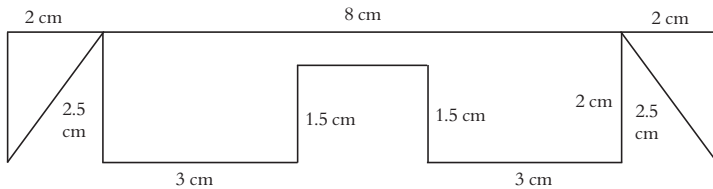


12. $\angle ABC = 40^\circ$



Exercise 16.1

- Perimeter = $4 \times \text{sides} = 4 \times 16 = 64 \text{ cm}$
- Perimeter of a rectangle = $2(L + B)$
 $18 = 2(L + 6)$; $18 = 2L + 12$; $18 - 12 = 2L$; $6 = 2L$; $\frac{6}{2} = L$; $3 = L$
 \therefore Length is 3 cm
- Perimeter = $2(L + B) = 2(7 + 4) = 2 \times 11 = 22 \text{ cm}$
- Perimeter of a triangle = sum of 3 sides
 Let the third side of triangle be $x \text{ cm}$
 $40 = 9 + 7 + x$; $40 = 16 + x$; $40 - 16 = x$; $24 = x$
 \therefore Third side a triangle is 24 cm
- (a) Perimeter = $1 + 2.5 + 1 + 2 + 3 + 2 = 11.5 \text{ cm}$
 (b) Perimeter = $2 + 8 + 2 + 1.5 + 2.5 + 2 + 3 + 1.5 + 2 + 1.5$
 $+ 3 + 1.5 + 2.5 + 1.5 = 11.5 \text{ cm}$



Reason :

$$AB = CL = DG = EF = 2 \text{ cm}$$

$$JI = 2 \text{ cm } BE = BC + CD + DE = 8 + 2 + 2 = 12$$

and $BE = AF$

$$12 = AL + LK + KH + GH + GF$$

$$12 = 2 + 3 + KH + 3 + 2; 12 = 10 + KH; 2 = KH$$

$$\text{But } KH = JI = 2 \text{ cm}$$

Exercise 16.2

- Area of a rectangular field = $L \times B$
 Area = $125 \times 80 = 10,000 \text{ m}^2$
- Perimeter of a square = $4 \times \text{sides}$
 $= 4 \times 18 = 72 \text{ cm}$
- Area of a square = 144 cm^2
 Side of a square = 12 cm
 Perimeter of a square = $4 \times 12 = 48 \text{ cm}$

4. Length of the rectangular field = 150 m
 Breadth of the rectangular field = 120 m
 Perimeter = $2(L + B)$
 $= 2(150 + 120) = 2 \times 270 = 540$ m
 Cost of fencing 2 m = ₹3
 Cost of fencing 1 m = ₹ $\frac{3}{2}$
 Cost of fencing 540 m = ₹ $\frac{3}{2} \times 540 = ₹ 810$

5. Breadth of the rectangle = 120 m
 Ratio = $\frac{2}{5}$ of $x = 120$
 $\frac{2}{5} \times x = 120; x = \frac{120 \times 5}{2} = 300$ m
 Length of the rectangle = $\frac{3}{5}$ of $300 = \frac{3}{5} \times 300 = 180$
 perimeter of rectangle = $2(L + B) = 2(180 + 120) = 2 \times 300 = 600$ m

Exercise 17.1

1.

Means of Transport	Number of students
Walking	0000
Bus	0000000
Bicycle	0
Care	00

Key = Each 0 stands for 50 students

2.

year	Population of the Country
1950	00000
1960	0000000000
1970	00000000
1980	000000000
1990	0000000000
2000	000000000000

Key = Each 0 stands for 5 million people

3.

Year	Population of the Country
Parents	000000
Grandparents	0000
Children	00000

Key = Each 0 stands for 25 people

4.

Day	Weight of rice sold
Monday	00
Tuesday	00000
Wednesday	000
Thursday	0000000
Friday	00
Saturday	0000

Key = Each 0 stands for 50 kg

5.

Day	Students
Monday	00000000000000000000
Tuesday	00000000000000000000
Wednesday	0000000000000000
Thursday	00000000000000000000
Friday	00000000000000000000

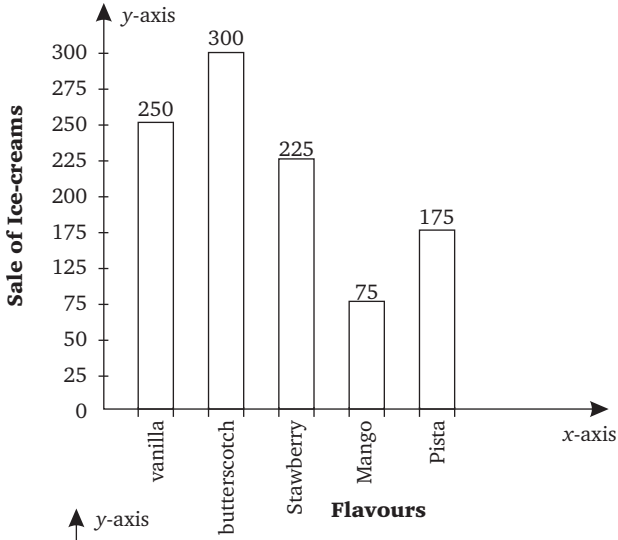
Key = Each 0 stands for 2 students

Exercise 17.2

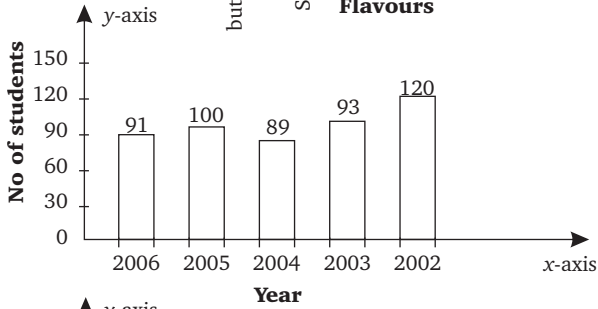
1.



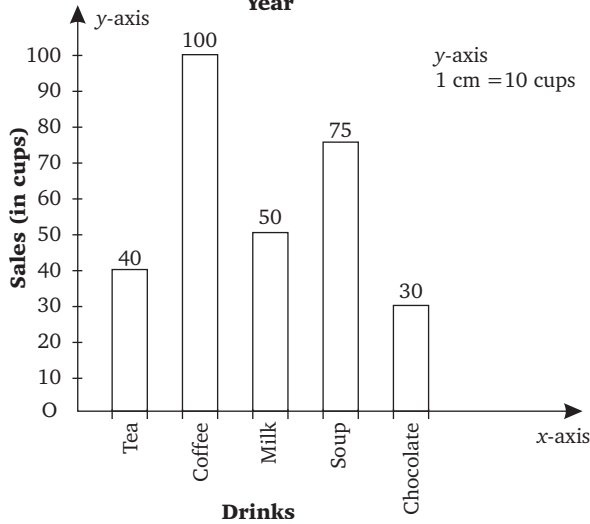
2.



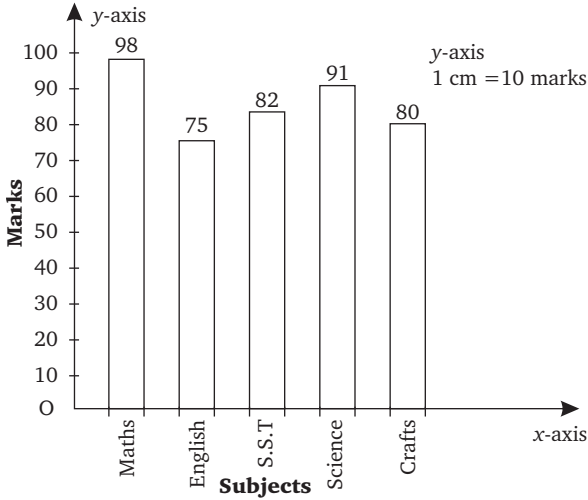
3.



4.



5.



Exercise 17.3

1. Mean

2. (a)
$$\text{Average} = \frac{\text{Total sum of quantities}}{\text{Total number of quantities}}$$

$$= \frac{19 + 21 + 18 + 30 + 15 + 22 + 25 + 23 + 17 + 10}{10} = \frac{200}{10} = 20$$

(b)
$$\text{Average} = \frac{12 + 8 + 16 + 20 + 16 + 24 + 12 + 28 + 12}{9} = \frac{148}{9} = 16.4$$

(c)
$$\text{Average} = \frac{72 + 64 + 68 + 76 + 65 + 75 + 70}{7} = \frac{490}{7} = 70$$

(d)
$$\text{Average} = \frac{9 + 14 + 13 + 15 + 13 + 14 + 15 + 16 + 12 + 14}{10} = \frac{135}{10} = 13.5$$

(f)
$$\text{Average} = \frac{200 + 175 + 225 + 250 + 150}{5} = \frac{1000}{5} = 200$$

(g)
$$\text{Average} = \frac{7 + 7 + 8 + 8 + 9 + 10 + 8 + 9 + 7 + 8 + 9 + 8}{12} = \frac{98}{12} = 8.16$$

3.
$$\text{Average} = \frac{1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10}{10} = \frac{55}{10} = 5.5$$

4. odd number between 20 and 40 are

21, 23, 25, 27, 29, 31, 33, 35, 37, 39

$$\text{Average} = \frac{21 + 23 + 27 + 29 + 31 + 33 + 35 + 37 + 39}{10} = \frac{300}{10} = 30$$

5. Multiples of 5 between 25 and 50 are 25, 30, 35, 40, 45, 50

$$\text{Average} = \frac{25 + 30 + 35 + 40 + 45 + 50}{6} = \frac{225}{6} = 37.5$$

6. $\text{Average} = \frac{\text{Total number of toffees}}{\text{Total number of children}}$

$$27 = \frac{\text{Total number of toffees}}{8}; \quad 27 \times 8 = \text{Total number of toffees}$$

$$216 = \text{Total number of toffees}$$

7. $\text{Average} = \frac{\text{Total number of marks}}{\text{Number of Subjects}}$

$$65 = \frac{\text{Total number of marks}}{6}; \quad 65 \times 6 = \text{Total number of marks}$$

$$390 = \text{Total number of marks}$$

8. $\text{Average} = \frac{\text{Total rainfall in Chennai}}{\text{Number of children}}$

$$310 = \frac{\text{Total rainfall in chennai}}{7}; \quad 310 \times 7 = \text{Total rainfall in chennai}$$

$$2170 \text{ mm} = \text{total rainfall in chennai}$$

9. $\text{Average} = \frac{\text{Total height of children}}{\text{Number of children}}$

$$142 = \frac{\text{Total height of children}}{22}; \quad 142 \times 22 = \text{Total height of children}$$

$$3124 = \text{Total height of children}$$

10. $\text{Average} = \frac{\text{Total Capacity}}{\text{Number of drums}}; \quad 120 = \frac{\text{Total Capacity}}{13}$

$$120 \times 13 = \text{Total capacity}$$

$$\text{Total capacity} = 1560 \text{ litres}$$

11. $\text{Average} = (-1) + (-2) + (-3) + (-4) + (-5) + (-6) + (-7) + (-8) + (-9)$

$$+ (-10) + (-11) + (-12) + (-13) + (-14) + (-15) +$$

$$\frac{(-16) + (-17) + (-18) + (-19) + (-20)}{20} = \frac{210}{20} = 10.5$$

12. $\text{Average} = \frac{38 + 75 + 63 + 57 + 42}{5} = \frac{275}{5} = 55\%$

13. $\text{Average} = \frac{\text{Total percentage scored by students}}{\text{Number of studens}}$

$$15.5\% = \frac{\text{Total Percentage scored}}{8}$$

$$15.5 \times 8 = \text{Total percentage scored}$$

$$124\% = \text{Total percentage scored.}$$

$$14. \text{ Average} = \frac{\text{Total weight of 7 players}}{\text{Number of players}}$$

$$65\text{kg} = \frac{\text{Total Weight of 7 players}}{7}$$

$$80 \times 7 = \text{Total weight of 7 players}$$

$$560 \text{ kg} = \text{Total weight of 7 players}$$

$$\text{New Average} = \frac{\text{Total weight of 5 players}}{\text{Number of 5 players}}$$

$$75 \text{ kg} = \frac{\text{Total weight of 5 players}}{5}$$

$$78 \times 5 = \text{Total weight of 5 players}$$

$$390 \text{ kg} = \text{total weigh of 5 players}$$

$$\begin{aligned} \text{Weight of 2 players} &= \text{Weight of 7 players} - \text{weight of 5 players} \\ &= 560 - 390 = 170 \text{ kg} \end{aligned}$$

$$15. \text{ Average} = \frac{\text{Total number of attendance of 20 students}}{\text{Number of days in all}}$$

$$= \frac{22 + 18 + 14}{22} = \frac{54}{22} = 2.4$$

Exercise 17.4

$$1. \text{ Median} = \frac{13 + 15}{2} = \frac{28}{2} = 14$$

$$\text{Mode} = 13; \text{ Range} = 19 - 3 = 16$$

$$2. \text{ Median} = 9; \text{ Mode} = 20$$

$$\text{Range} = 27 - 9 = 18$$

$$3. \text{ Median} = -\frac{105 + 110}{2} = -\frac{215}{2} = 107.5$$

$$\text{Mode} = 95; \quad \text{Range} = 110 - 90 = 20$$

$$4. \text{ Median} = 55; \quad \text{Mode} = 44$$

$$\text{Range} = 89 - 44 = 45$$

$$5. \frac{14 + 6}{2} = \frac{20}{2} = 10 \text{ Median}$$

$$\text{Mode} = 12; \quad \text{Range} = 22 - 2 = 20$$

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