

Foundation Mathematics

6

1. Knowing Our Numbers : Natural and Whole

Learning Target 1.1

- (i) 10000, 9999 (ii) 99999, 100000 (iii) largest
(iv) six (v) 10000 to 99999
- (i) (a) One lakh sixty three thousand four hundred sixty two
(b) Twenty seven lakh fourteen thousand six hundred fifty
(c) One crore twenty–seven lakh ninety one thousand four hundred fifty eight
(ii) (a) One hundred sixty three thousand four hundred sixty two
(b) Two million seven hundred fourteen thousand six hundred fifty.
(c) Twelve million seven hundred ninety one thousand four hundred fifty eight.
- Thirty three crore thirty two lakh twenty two thousand one hundred and eleven.
- 49995
- (i) (d), (ii) (c), (iii) (a), (iv) (b)
- (i) Seven lakh twenty six thousand nine hundred thirty four
(ii) Six crore thirty two lakh eleven thousand thirty six.
- (i) One million six hundred thirty five thousand fifteen
(ii) Ninety one million five hundred thousand seven hundred fifty six.

Learning Target 1.2

- (i) < (ii) < (iii) = (iv) > (v) =
(vi) > (vii) < (viii) >
- (i) > (ii) > (iii) < (iv) = (v) >
(vi) < (vii) = (viii) <
- (i) 98273496, 98273498
(ii) 72373, 72375
(iii) 7354526, 7354528
(iv) 173899, 173901
(v) 99999, 100001
- (i) 729; 28784; 82878; 92929; 732989; 928398
(ii) 1919373; 8184628; 8215651; 8230409; 8276255; 9377643
(iii) 101; 1010; 10101; 101010; 1010101; 101010101;
(iv) 16716716; 561936362; 818298199; 820028232; 821946228
(v) 1; 83993, 715551; 778433487; 91738299; 778434877,

5. (i) 7287816, 7237972, 7166346, 5166353, 863644
(ii) 871636369, 816372941, 749274647, 651443365, 193745274
(iii) 54663533, 54662533, 54162533, 52874696, 52366454
(iv) 371858226, 371828226, 371818226, 371817226, 371808226
(v) 1285712, 1283712, 1282712, 1282710, 1282112, 1280712.

Apply Your Mind !

1. (c), 2. (c), 3. (d), 4. (b).



2. Playing With Numbers

Learning Target 2.1

1. (i) 1, 19
(ii) 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
(iii) 1, 29
(iv) 1, 2, 4, 8, 16, 32
(v) 1, 2, 5, 10, 25, 50
(vi) 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
(vii) 1, 2, 4, 19, 38, 76
(viii) 1, 89
(ix) 1, 5, 25, 125
(x) 1, 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 36, 48, 72, 144
(xi) 1, 11, 23, 253
(xii) 1, 3, 9, 27, 81, 243
2. (i) 15, 30, 45, 60, 75 (ii) 17, 34, 51, 68, 85
(iii) 19, 38, 57, 76, 95 (iv) 35, 70, 105, 140, 175
(v) 50, 100, 150, 200, 250
3. (ii); (iii)
4. (i); (iii)
5. (i) 83, 89, 97
(ii) 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157
(iii) 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173
(iv) 163, 167, 173, 179, 181, 191, 193, 197, 199
6. Yes, 9
7. 90, 91, 92, 93, 94, 95, 96

8. Only one, 2
9. (i), (iii), (v)
10. (i) No (ii) Four namely 4, 9, 25, 49
11. (i) $3 + 31$ (ii) $3 + 37$ (iii) $3 + 53$ (iv) $7 + 73$ (v) $3 + 97$
12. (i) $3 + 5 + 23$ (ii) $3 + 5 + 43$ (iii) $3 + 5 + 51$
 (iv) $3 + 5 + 69$ (v) $3 + 5 + 97$
13. Composite
14. 1, 3, 7, 9.

Learning Target 2.2

1. (i) F (ii) T (iii) T (iv) F (v) T
 (vi) T
2. (i) 1344 is divisible by 2 since it is even.
 1344 is divisible by 3 since $1 + 3 + 4 + 4 = 12$ is divisible by 3.
 1344 is not divisible by 5 since the last digit is not 5 or 0.
 1344 is not divisible by 9 since $1 + 3 + 4 + 4 = 12$ is not divisible by 9.
- (ii) 990 is divisible by 2 since it is even.
 990 is divisible by 3 since $9 + 9 + 0 = 18$ is divisible by 3.
 990 is divisible by 5 since the last digit is 5 or 0.
 990 is divisible by 9 since $9 + 9 + 0 = 18$ is divisible by 9.
- (iii) 2050 is divisible by 2 since it is even.
 2050 is not divisible by 3 since $2 + 0 + 5 + 0 = 7$ is not divisible by 3.
 2050 is divisible by 5 since the last digit is 5 or 0.
 2050 is not divisible by 9 since $2 + 0 + 5 + 0 = 7$ is not divisible by 9.
- (iv) 17136 is divisible by 2 since it is even.
 17136 is divisible by 3 since $1 + 7 + 1 + 3 + 6 = 18$ is divisible by 3.
 17136 is not divisible by 5 since the last digit is not of 5 or 0.
 17136 is divisible by 9 since $1 + 7 + 1 + 3 + 6 = 18$ is divisible by 9.
3. (i) 12159 is not divisible by 4 since 59 is not divisible by 4.
 (ii) 4096 is divisible by 4 since 96 is divisible by 4.
 (iii) 14540 is divisible by 4 since 40 is divisible by 4.
 (iv) 78491 is not divisible by 4 since 91 is not divisible by 4.
4. (i) 4554 is divisible by 11 since $(4 + 5) - (5 + 4) = 0$.
 (ii) 9020814 is divisible by 11 since $(9 + 2 + 8 + 4) - (0 + 0 + 1)$
 $= 22$ is multiple of 11.
 (iii) 3256911 is not divisible by 11 since $(3 + 5 + 9 + 1) - (2 + 6 + 1)$
 $= 9$ is neither 0 nor multiple of 11.
 (iv) 70169803 is divisible by 11 since $(7 + 1 + 9 + 0) - (0 + 6 + 8 + 3)$
 $= 0$.

Learning Target 2.3

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

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

(ii)
$$\begin{array}{r|l} 2 & 34 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

$$34 = 2 \times 17$$

(iii)
$$\begin{array}{r|l} 2 & 98 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

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

(v)
$$\begin{array}{r|l} 2 & 360 \\ \hline 2 & 180 \\ \hline 2 & 90 \\ \hline 3 & 45 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$98 = 2 \times 7 \times 7 \quad 216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \quad 360 = 2 \times 2 \times 2 \times 3 \times 3 \times 5$$

(vi)
$$\begin{array}{r|l} 2 & 468 \\ \hline 2 & 234 \\ \hline 3 & 117 \\ \hline 3 & 39 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

(vii)
$$\begin{array}{r|l} 3 & 441 \\ \hline 3 & 147 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$468 = 2 \times 2 \times 3 \times 3 \times 13 \quad 441 = 3 \times 3 \times 7 \times 7$$

(viii)
$$\begin{array}{r|l} 2 & 540 \\ \hline 2 & 270 \\ \hline 3 & 135 \\ \hline 3 & 45 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

(ix)
$$\begin{array}{r|l} 2 & 9000 \\ \hline 2 & 4500 \\ \hline 2 & 2250 \\ \hline 3 & 1125 \\ \hline 3 & 375 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5 \quad 900 = 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 5$$

$$\begin{array}{r|l}
 \text{(x)} & 2 \mid 1260 \\
 \hline
 & 2 \mid 630 \\
 \hline
 & 3 \mid 315 \\
 \hline
 & 3 \mid 105 \\
 \hline
 & 5 \mid 35 \\
 \hline
 & 7 \mid 7 \\
 \hline
 & 1
 \end{array}
 \quad
 \begin{array}{r|l}
 \text{(xi)} & 3 \mid 2145 \\
 \hline
 & 5 \mid 715 \\
 \hline
 & 11 \mid 143 \\
 \hline
 & 13 \mid 13 \\
 \hline
 & 1
 \end{array}$$

$$1260 = 2 \times 2 \times 3 \times 3 \times 5 \times 7 \quad 2145 = 2 \times 5 \times 11 \times 13$$

$$\begin{array}{r|l}
 \text{(xii)} & 5 \mid 7325 \\
 \hline
 & 5 \mid 1465 \\
 \hline
 & 293 \mid 293 \\
 \hline
 & 1
 \end{array}
 \quad
 7325 = 5 \times 5 \times 293$$

2. Smallest 5-digit number = 10000

$$\begin{array}{r|l}
 2 \mid 10000 \\
 \hline
 2 \mid 5000 \\
 \hline
 2 \mid 2500 \\
 \hline
 2 \mid 1250 \\
 \hline
 5 \mid 625 \\
 \hline
 5 \mid 125 \\
 \hline
 5 \mid 25 \\
 \hline
 5 \\
 \hline
 1
 \end{array}
 \quad
 10000 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$$

3. The largest 4-digit number = 9999

$$\begin{array}{r|l}
 3 \mid 9999 \\
 \hline
 3 \mid 3333 \\
 \hline
 11 \mid 1111 \\
 \hline
 101 \mid 101 \\
 \hline
 1
 \end{array}
 \quad
 9999 = 3 \times 3 \times 11 \times 101$$

$$\begin{array}{r|l}
 4. & 7 \mid 1729 \\
 \hline
 & 13 \mid 247 \\
 \hline
 & 19 \mid 19 \\
 \hline
 & 1
 \end{array}
 \quad
 1729 = 7 \times 13 \times 19$$

Here, difference between two consecutive factors is 6.

Learning Target 2.4

1. (i) T (ii) T (iii) F (iv) T (v) F

2. (i)

2	162
3	81
3	27
3	9
	3

2	234
3	117
3	39
	13

HCF = $2 \times 3 \times 3 = 18$

(ii)

17	17
	1

47	47
	1

HCF = 1

(iii)

13	13
	1

3	39
13	13
	1

3	273
7	91
13	13

HCF = 13

(iv) 150, 140, 210

2	150
3	75
5	25
5	5
	1

2	140
2	70
5	35
7	7
	1

2	210
3	105
5	35
7	7
	1

HCF = $2 \times 5 = 10$

(v) 120, 144, 204

2	120
2	60
2	30
3	15
5	5
	1

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

2	204
2	102
3	51
17	17
	1

HCF = $2 \times 2 \times 3 = 12$

(vi) 106, 159, 265

$$\begin{array}{r|l} 2 & 106 \\ \hline 53 & 53 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 3 & 159 \\ \hline 53 & 53 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 265 \\ \hline 53 & 53 \\ \hline & 1 \end{array}$$

HCF = 53

(vii) 101, 573, 1079

$$\begin{array}{r|l} 101 & 101 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 3 & 573 \\ \hline 191 & 191 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 13 & 1079 \\ \hline 83 & 83 \\ \hline & 1 \end{array}$$

HCF = 1

(viii) 625, 3125, 15625

$$\begin{array}{r|l} 5 & 625 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 3125 \\ \hline 5 & 625 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 15625 \\ \hline 5 & 3125 \\ \hline 5 & 625 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

HCF = $5 \times 5 \times 5 \times 5 = 625$

3. (i) 252) 576 (2

$$\begin{array}{r} 504 \\ \hline 72) 252 (3 \\ \hline 216 \\ \hline 36) 72 (2 \\ \hline 72 \\ \hline \times \end{array}$$

HCF = 36

(ii) 935) 1320

$$\begin{array}{r} 935) 1320 (1 \\ \hline 935 \\ \hline 385) 935 (2 \\ \hline 770 \\ \hline 165) 385 (2 \\ \hline 330 \\ \hline 55) 165 (3 \\ \hline 165 \\ \hline \times \\ \hline \text{HCF} = 55 \end{array}$$

(iii) 516, 1188, 2148

516) 1188 (2

$$\begin{array}{r} 1032 \\ \hline 156) 516 (3 \\ \hline 468 \\ \hline 48) 156 (3 \\ \hline 144 \\ \hline 12) 48 (4 \\ \hline 48 \\ \hline \times \end{array}$$

HCF = 12

12) 2148 (179

$$\begin{array}{r} 12 \\ \hline 94 \\ \hline 84 \\ \hline 108 \\ \hline 108 \\ \hline \times \end{array}$$

(iv) 2241, 8217, 747

747) 2241 (3

$$\begin{array}{r} 2241 \\ \times \\ \hline \end{array}$$

747) 8217 (11

$$\begin{array}{r} 747 \\ 747 \\ \times \\ \hline \end{array}$$

HCF = **747**

4. The HCF of any two consecutive number is 1.

5. Two nearest number = $65610 + 27 = \mathbf{65637}$, $65610 - 27 = \mathbf{65583}$

6. 850, 680

680) 850 (1

$$\begin{array}{r} 680 \\ \hline 170) 680 (4 \\ \underline{680} \\ \times \end{array}$$

7. $1343 - 9 = 1334$

$8593 - 9 = 8584$

1334) 8584 (6

$$\begin{array}{r} 8004 \\ \hline 580) 1334 (2 \\ \underline{1160} \\ 174) 580 (3 \\ \underline{522} \\ 58) 174 (3 \\ \underline{174} \\ \times \end{array}$$

HCF = **58**

The largest number is 58.

The maximum capacity of the container which can measure the petrol of tanker in exact number of times = 170

8. Length = 2 m 67 cm = 267 cm

Breadth = 4 m 45 cm = 445 cm

Height = 7 m 12 cm = 712 cm

267, 445, 712

267) 445 (1

$$\begin{array}{r} 267 \\ \hline 178) 267 (1 \\ \underline{178} \\ 89) 178 (2 \\ \underline{178} \\ \times \end{array}$$

89) 712 (8

$$\begin{array}{r} 712 \\ \times \\ \hline \end{array}$$

HCF = **89**

Thus the longest tape which can measure the three dimensions of room exactly is **89 cm**.

9. $731 - 9 = 722$

$1132 - 11 = 1121$

$1822 - 17 = 1805$

HCF of 722, 1121, and 1805

722) 1121 (1

$$\begin{array}{r} \underline{722} \\ 399) \underline{722} \text{ (1)} \\ \underline{399} \\ 323) \underline{399} \text{ (1)} \\ \underline{323} \\ 76) \underline{323} \text{ (4)} \\ \underline{304} \\ 19) \underline{76} \text{ (4)} \\ \underline{76} \\ \times \end{array}$$

19) 1805 (95

$$\begin{array}{r} \underline{171} \\ 95 \\ \underline{95} \\ \times \end{array}$$

HCF = 19

Learning Target 2.5

1. (i) 18, 77

$$\begin{array}{r|l} 2 & 18, 77 \\ \hline 3 & 9, 77 \\ \hline 3 & 3, 77 \\ \hline 7 & 1, 11 \\ \hline & 1, 11 \end{array}$$

LCM = $2 \times 3 \times 7 \times 11 = 1386$

(ii) 15, 30, 90

$$\begin{array}{r|l} 2 & 15, 30, 90 \\ \hline 3 & 15, 15, 45 \\ \hline 3 & 5, 5, 15 \\ \hline 5 & 5, 5, 5 \\ \hline & 1, 1, 1 \end{array}$$

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

(iii) 45, 105, 165

$$\begin{array}{r|l} 3 & 45, 105, 165 \\ \hline 3 & 15, 35, 55 \\ \hline 5 & 5, 35, 55 \\ \hline 7 & 1, 7, 11 \\ \hline 11 & 1, 1, 11 \\ \hline & 1, 1, 1 \end{array}$$

LCM = $3 \times 3 \times 5 \times 7 \times 11 = 3465$

(iv) 6, 15, 18, 30

$$\begin{array}{r|l} 2 & 6, 15, 18, 30 \\ \hline 3 & 3, 15, 9, 15 \\ \hline 3 & 1, 5, 3, 5 \\ \hline 5 & 1, 5, 1, 5 \\ \hline & 1, 1, 1, 1 \end{array}$$

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

(v) 180, 384, 144

2	180, 384, 144
2	90, 192, 72
2	45, 96, 36
2	45, 48, 18
2	45, 24, 9
2	45, 12, 9
2	45, 6, 9
3	45, 3, 9
3	15, 1, 3
5	5, 1, 1
	1, 1, 1

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 = \mathbf{5760}$$

(vii) 108, 135, 162

2	108, 135, 162
2	54, 135, 81
3	27, 135, 81
3	9, 45, 27
3	3, 15, 9
3	1, 5, 3
5	1, 5, 1
	1, 5, 1

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

(vi) 150, 450, 550

2	150, 450, 550
3	75, 225, 275
3	25, 75, 275
5	25, 25, 275
5	5, 5, 55
11	1, 1, 11
	1, 1, 1

$$\text{LCM} = 2 \times 3 \times 3 \times 5 \times 5 \times 11 = \mathbf{4950}$$

(viii) 128, 216, 432

2	128, 216, 432
2	64, 108, 216
2	32, 54, 108
2	16, 27, 54
2	8, 27, 27
2	4, 27, 27
2	2, 27, 27
3	1, 27, 27
3	1, 9, 9
3	1, 3, 3
	1, 1, 1

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = \mathbf{3456}$$

2.

2	35, 50, 80
2	35, 25, 40
2	35, 25, 20
2	35, 25, 10
5	35, 25, 5
	7, 5, 1

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 5 \times 7 \times 5 = \mathbf{2800}$$

Hence remainder is 9 then the required number = $2800 + 9 = \mathbf{2809}$

3. No.

4. I number II number = LCM \times HCF

$$64 = 16 \times \text{HCF}$$

$$\text{HCF} = \frac{64}{16} = 4$$

5. No, because HCF must be a factor of LCM.

6. I number \times II number = LCM \times HCF

$$105 \times \text{II number} = \text{LCM} \times \text{HCF}$$

$$\text{II Number} = \frac{1575 \times 15}{105} = 225$$

$$7. \begin{array}{r|l} 2 & 220, 300 \\ \hline 2 & 110, 150 \\ \hline 3 & 55, 75 \\ \hline 5 & 55, 25 \\ \hline 5 & 11, 5 \\ \hline 11 & 11, 1 \\ \hline & 1, 1 \end{array}$$

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

$$= 3300 \text{ m}$$

$$8. \begin{array}{r|l} 2 & 80, 85, 90 \\ \hline 2 & 40, 85, 45 \\ \hline 2 & 20, 85, 45 \\ \hline 2 & 10, 85, 45 \\ \hline 3 & 5, 85, 45 \\ \hline 3 & 5, 85, 15 \\ \hline 5 & 5, 85, 5 \\ \hline 17 & 1, 17, 1 \\ \hline & 1, 1, 1 \end{array}$$

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 17$$

$$= 12240 \text{ cm} = 122 \text{ m } 40 \text{ cm}$$

9. LCM of 2, 5, 7, 8, 10 and 13 = 3640

Now above 10000 it is 10920 and below 10000 it is 7280 which is exactly divide by 2, 5, 7, 8, 10 and 13.

10. LCM of 8, 15, 21 = 840

Now greater than 100000 it is 100800 which is exactly divisible by 8, 15 and 21.

$$11. (i) \begin{array}{r|l} 2 & 14, 21 \\ \hline 3 & 7, 21 \\ \hline 7 & 7, 7 \\ \hline & 1, 1 \end{array}$$

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

$$\begin{array}{r} 14) 21 (1 \\ 7) 14 (2 \\ \hline 14 \\ \hline \times \end{array}$$

$$\text{HCF} = 7$$

(ii) 25, 65

$$\begin{array}{r|l} 5 & 25, 65 \\ \hline 5 & 5, 13 \\ \hline 13 & 1, 13 \\ \hline & 1, 1 \end{array}$$

$$\text{LCM} = 25 \times 13 = 325$$

$$\begin{array}{r}
 25) 65 \ (2) \\
 \underline{50} \\
 15) 25 \ (1) \\
 \underline{15} \\
 10) 15 \ (1) \\
 \underline{10} \\
 5) 10 \ (2) \\
 \underline{10} \\
 \underline{\times} \\
 \text{HCF} = 5
 \end{array}$$

Product of two number = HCF \times LCM
 $25 \times 65 = 325 \times 5$
 $1625 = 1625$

(iii) 27, 90

$$\begin{array}{r|l}
 2 & 27, 90 \\
 \hline
 3 & 27, 45 \\
 \hline
 3 & 9, 15 \\
 \hline
 3 & 3, 5 \\
 \hline
 5 & 1, 5 \\
 \hline
 & 1, 1
 \end{array}$$

LCM = $2 \times 3 \times 3 \times 3 \times 5 = 270$

$$\begin{array}{r}
 27) 90 \ (3) \\
 \underline{81} \\
 9) 27 \ (3) \\
 \underline{27} \\
 \underline{\times} \\
 \text{HCF} = 9
 \end{array}$$

Product of two number = HCF \times LCM
 $27 \times 90 = 270 \times 9$
 $2430 = 2430$

(iv) 117, 221

$$\begin{array}{r|l}
 3 & 117, 221 \\
 \hline
 3 & 39, 221 \\
 \hline
 13 & 13, 221 \\
 \hline
 17 & 1, 17 \\
 \hline
 & 1, 1
 \end{array}$$

LCM = $3 \times 3 \times 13 \times 17 = 1989$

$$\begin{array}{r}
 117) 221 \ (1) \\
 \underline{117} \\
 104) 117 \ (1) \\
 \underline{104} \\
 13) 104 \ (8) \\
 \underline{104} \\
 \underline{\times} \\
 \text{HCF} = 13
 \end{array}$$

Product of two number = HCF \times LCM
 $117 \times 221 = 1989 \times 13$
 $25857 = 25857$

Apply Your Mind!

- (b) 87941032 is divisible by 4 since 32 is divisible by 4.
- (a) 15266706 is divisible by 3 since $1 + 5 + 2 + 6 + 6 + 7 + 0 + 6 = 33$ is divisible by 3.
- (d) 97 is a prime number.
- (a) HCF of 144, 180 and 192

$$144) 180 \text{ (1)}$$

$$\begin{array}{r} 144 \\ \hline 36) 144 \text{ (4)} \end{array}$$

$$\begin{array}{r} 144 \\ \times \\ \hline \end{array}$$

$$\times$$

$$36) 192 \text{ (5)}$$

$$\begin{array}{r} 180 \\ \hline 12) 36 \text{ (3)} \end{array}$$

$$\begin{array}{r} 14 \\ \times \\ \hline \end{array}$$

$$\times$$

Thus, HCF of 14, 180 and 192 is **12**.

- (b) Given HCF = 145 and LCM = 2175

$$\text{First number} = 725$$

$$\text{Other number} = \frac{\text{HCF} \times \text{LCM}}{\text{first number}} = \frac{1445 \times 2175}{725} = \mathbf{435}$$



3.

Integers

Learning Target 3.1

- (i) F (ii) F (iii) T (iv) F
(v) F (vi) F (vii) T
- (i) Spending money (ii) Going west/Coming East
(iii) Rise in temperature (iv) 200 AD
(v) Decrease in population (vi) Withdrawing money from bank
- (i) -25 (ii) -100 (iii) +3 (iv) +16
(v) +3 (vi) -5
- (i) 0 (ii) 3 (iii) 4 (iv) -6
- (i) -3 (ii) -2 (iii) -5 (iv) -125
- (i) 1, 2, 3, 4, 5 (ii) -5, -4, -3, -2, -1, 0
(iii) -2, -1, 0; 1 (iv) 0, 1, 2, 3, 4
- (i) < (ii) < (iii) < (iv) >
- (i) 0 (ii) 107 (iii) 11 (iv) 29
(v) 245 (vi) 1024.

Learning Target 3.2

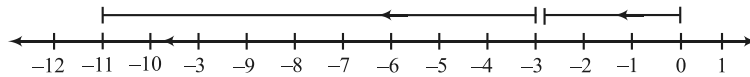
- (i) T (ii) T (iii) F (iv) F
(v) F (vi) F

2. (i) -11 (ii) -1 (iii) -3 (iv) -10
 3. (i) -1 (ii) -10 (iii) 7 (iv) -3
 4. (i) 9999 (ii) -98645 (iii) -134 (iv) 2564
 (v) -818 (vi) -8994 (vii) 2004 (viii) 0
 (ix) -1 (x) -5832 (xi) -1100
 5. (i) 600 (ii) -481 (iii) 0 (iv) 500
 (v) 2900 (vi) 1 (vii) -2 (viii) 1216
 (ix) 503 (x) 0
 6. (i) -5 (ii) -3 (iii) 12 (iv) 29.

Learning Target 3.2

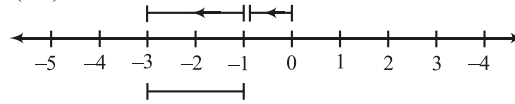
1. (i) T (ii) T (iii) F (iv) F (v) F
 (vi) F

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



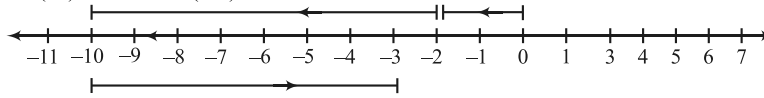
Addition of '-' integers $(-3) + (-8) = -11$

- (ii) $-1 + (-2) + 2$



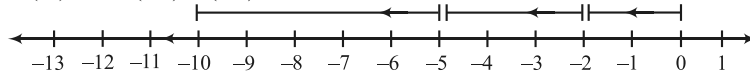
Addition of '-' and '+' integer $-1 + (-2) + 2 = -1$

- (iii) $-2 + 7 + (-8)$



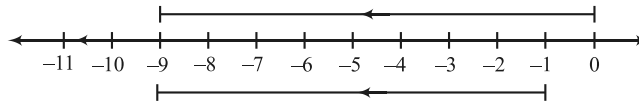
Addition of '-' and '+' integer $-2 + 7 + (-8) = -3$

- (iv) $-2 + (-3) + (-5)$



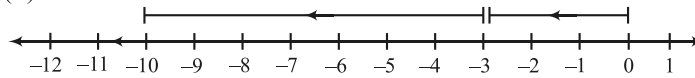
Addition of '-' integer $(-2) + (-3) + (-5) = -10$

3. (i) 8 more than -9



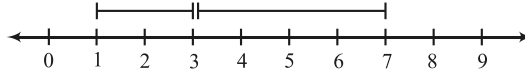
$8 + (-9) = -1$

- (ii) 7 less than -3



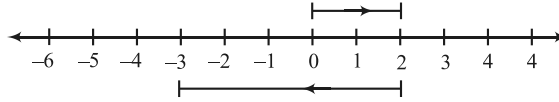
Subtraction of integer $(-3) - 7 = -10$

(iii) 4 more than 3



Addition of integer $4 + 3 = 7$

(iv) 5 less than 2



$$2 - 5 = -3$$

4. (i) $10001 + (-2) = \mathbf{9999}$ (ii) $-99005 + 360 = -\mathbf{98645}$
(iii) $-245 + 111 = -134$ (iv) $2567 + (-3) = 2564$
(v) $-498 + (-320) = -818$ (vi) $-8994 + 0 = -8994$
(vii) $3003 + (-999) = 2004$ (viii) $2884 + (-2884) = 0$
(ix) $2547 + (-2548) = -1$ (x) $-623 - 5832 + 623 = -6455 + 623$
 $= -5832$
(xi) $-982 - 18 - 2034 + 1934$
 $= -3034 + 1934 = -1100$
5. (i) $908 + (-8) + (-1) + 1 + (-300) = 908 - 8 - 1 + 1 - 300$
 $= 908 + 1 - (8 + 1) = 300$
 $= 909 - 309 = \mathbf{600}$
- (ii) $(-391) + (-81) + 9 + (-18) = -391 - 81 + 9 - 18$
 $= 9 - (391 + 81 + 18)$
 $= 9 - 490 = -481$
- (iii) $100 - 66 - 34 = 100 - 100 = 0$
- (iv) $1262 + (-366) + (-962) + 566 = 1262 - 366 - 962 + 566$
 $= 1262 + 566 - (366 + 962)$
 $= 1828 - 1328 = 500$
- (v) $373 + (-245) + (-373) + 145 + 3000$
 $= 373 + 145 + 3000 - (245 + 373)$
 $= 3518 - 618 = 2900$
- (vi) $1 + (-475) + (-475) + (-475) + (-475) + 1900$
 $= 1 + 1900 - (475 + 475 + 475 + 475)$
 $= 1901 - 1900 = \mathbf{1}$
- (vii) $1000 + 514 + (-517) + (-999) = 1000 + 514 - 517 - 999$
 $= 1514 - (517 + 999)$
 $= 1514 - 1516$
 $= -2$

$$\begin{aligned}
& \text{(viii) } 1024 + 512 + (-256) + (-128) + 64 \\
& \quad = 1024 + 512 - 256 - 128 + 64 \\
& \quad = 1024 + 512 + 64 - (256 + 128) \\
& \quad = 1600 - 384 = 1216 \\
& \text{(ix) } -243 + 27 + (-9) + 729 + (-1) = -243 + 27 - 9 + 729 - 1 \\
& \quad = 729 + 27 - (243 + 9 + 1) \\
& \quad = 756 - 253 = 503 \\
& \text{(x) } (-1) + (-304) + 304 + 304 + 304 + (-304) + 1 \\
& \quad = -1 - 304 + 304 + 304 - 304 + 1 \\
& \quad = (304 + 304 + 1) - (304 + 304 + 1) \\
& \quad = 609 - 609 = 0 \\
& \text{6. (i) } 5 + a = 0, a = 0 - 5 = -5 \\
& \text{(ii) } a + 3 = 0, a = 0 - 3 = -3 \\
& \text{(iii) } -12 + a = 0, a = 0 + 12 = 12 \\
& \text{(iv) } a + (-29) = 0, a = 0 + 29 = 29
\end{aligned}$$

Learning Target 3.3

$$\begin{aligned}
& \text{2. (i) } 4 - 10 = -6 \\
& \text{(ii) } 8 - 3 = 5 \\
& \text{(iii) } -100 - (-200) = -100 + 200 = 100 \\
& \text{(iv) } 10 - (-15) = 10 + 15 = 25 \\
& \text{(v) } 101 - 1001 = -900 \\
& \text{(vi) } -7 - 2 = -9 \\
& \text{(vii) } 3126 - (0812) = 3126 + 812 = 3938 \\
& \text{(viii) } -6 - (8650) = -6 - 8650 \\
& \text{(ix) } -4109 - (-3987) = -4109 + 3987 = -122 \\
& \text{(x) } 0 - (-155) = 0 + 155 = 155 \\
& \text{(xi) } 40321 - 83241 = -42920 \\
& \text{(xii) } -1005 - 0 = -1006 \\
& \text{3. } 7 - (-5) = 7 + 5 = 12 \text{ and } -5 - (7) = -5 - 7 = -12. \\
& \quad \text{So, the result are not same.} \\
& \text{4. } -230 + 169 = -61 \text{ and } -25 - (-61) = -25 + 61 = 36. \\
& \text{5. } 998 + (-486) = 998 - 486 = 512 \\
& \quad -290 + 732 = 442 \\
& \quad 442 - 512 = -70 \\
& \text{6. (i) } (-3) + (-7)^* (-3) - (-7) \\
& \quad -3 - 7^* - 3 + 7 \Rightarrow -10 < 4. \\
& \text{(ii) } (-15) - (13)^* (-15) + 15 \\
& \quad -15 + 13^* - 15 + 15 \Rightarrow -2 < 0
\end{aligned}$$

$$\begin{aligned} & \text{(iii)} (-25) - (25) * 25 + (-80) \\ & \Rightarrow -25 - 25 * 25 - 80; \\ & \Rightarrow -50 > -55. \end{aligned}$$

7. Sum of integers = - 396

One of them = 64

$$\text{Other} = -396 - 64 = -460.$$

8. The other integer is = $48 - (-24) = 48 + 24 = 72$.

9. (i) $-17 - (-13) = -17 + 13 = -4$.

$$\text{(ii)} -7 - 8 - (-25) = -(7 + 8) + 25 = -15 + 25 = 10$$

$$\text{(iii)} (2 - 3) + (2 - 3) = (-1) + (-1) = -1 - 1 = -2.$$

$$\text{(iv)} -13 + 32 - 18 - 1 = -13 - 18 - 1 + 32 = -32 + 32 = 0.$$

$$\text{(v)} 50 - (-48) - (-2) = 50 + 48 + 2 = 100$$

$$\text{(vi)} -7 + (-8) + (-90) = -7 - 8 - 90 = -105$$

$$\text{(vii)} 18 - [(-3) + 15] = 18 - (-3) - 15 = 18 + 3 - 15 = 6$$

$$\begin{aligned} \text{(viii)} -12 - [(-15) + (-2) - 3] &= -12 - [-15 - 2 - 3] \\ &= -12 - [-20] = -12 + 20 = 8. \end{aligned}$$

10. (i) $14 > -20 - (-50) \Rightarrow 14 < -20 + 50$

$$\Rightarrow 14 < 30 \text{ False}$$

(ii) $-39 + (-17) < 17 \Rightarrow -39 - 17 < 17$

$$-56 < 17 \text{ True}$$

(iii) False

(iv) True

11. Let $y = 3, x = 4$

$$\text{Then } x - y + 2 = 4 - 3 + 2 = 3.$$

12. $9 + (-9) + 9 + (-9) + 9 + (-9) + \dots$

(i) If number of terms is odd then result is 9.

(ii) If number of terms is even then result is 0.

13. Temperature of Delhi $13^\circ\text{C} - 6^\circ\text{C} = 7^\circ\text{C}$

$$\text{Temperature of Chennai } 18^\circ\text{C} - 10^\circ\text{C} = 8^\circ\text{C}$$

Chennai fall is greater, 8°C .

14. $1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + \dots 19 - 20$

$$= (1 - 2) + (3 - 4) + (5 - 6) + (7 - 8) + \dots (19 - 20)$$

$$= (-1) + (-1) + (-1) + (-1) + \dots (-1) = 10 \times (-1) = -10$$

Learning Target 3.4

1. (i) F (ii) T (iii) F (iv) T (v) F

2. (i) $(-8) \times 0 \times 37 \times (-37) = 0$

$$\begin{aligned} \text{(ii)} (1569 \times 887) - (569 \times 887) &= 887 \times (1569 - 569) \\ &= 887 \times 1000 = 887000 \end{aligned}$$

$$\begin{aligned} \text{(iii)} & (-183) \times (-44) + (-183) \times (-56) = -183[-44 + (-56)] \\ & = -183[-44 - 56] = -183 \times -100 = 18300 \\ \text{(iv)} & 18946 \times 99 - (-18946) = 18946[99 - (-1)] \\ & = 18946[99 + 1] \\ & = 18946 \times 100 = 1894600 \\ \text{(v)} & 15625 \times (-2) + (-15625) \times 98 = 15625 \times (-2 - 98) \\ & = 15625 \times (-100) = -\mathbf{1562500} \\ \text{(vi)} & (-80) \times (10 - 5 - 43 + 98) = (-80) \times (108 - 48) \\ & = (-80) \times (60) = -\mathbf{4800} \end{aligned}$$

3. (i) $2 \times (-15) = -\mathbf{30}$
(ii) $(-225) \times 8 = -1800$
(iii) $(-17) \times (-20) = \mathbf{340}$
(iv) $3 \times (-8) \times 5 = -24 \times 5 = -120$
(v) $9 \times (-3) \times (-6) = -27 \times -6 = 162$
(vi) $(-12) \times (-12) \times (-12) = 144 \times (-12) = -1728$
(vii) $(-2) \times 36 \times (-5) = -72 \times -5 = 360$
(viii) $(-8) \times (-43) \times 0 = 0$
(ix) $18 \times (-185) \times (-4) = -3330 \times -4 = 13320$
(x) $(-45) \times 55 \times (-10) = -2475 \times -10 = 24750$
(xi) $(-1) \times (-2) \times (-3) \times (-4) \times (-5) = -\mathbf{120}$
(xii) $(-3) \times (-6) \times (-9) \times (-12) = 18 \times 108 = 1944$

4.

	First Number					Second Number				
x	-4	-3	-2	-1	0	1	2	3	4	
-4	16	12	8	4	0	-4	-8	-12	-16	
-3	12	9	6	3	0	-3	-6	-9	-12	
-2	8	6	4	2	0	-2	-4	-6	-8	
-1	4	3	2	1	0	-1	-2	-3	-4	
0	0	0	0	0	0	0	0	0	0	
1	-4	-3	-2	-1	0	1	2	3	4	
2	-8	-6	-4	-2	0	2	4	6	8	
3	-12	-9	-6	-3	0	3	6	9	12	Yes; Yes; $a \times b = b \times a$
4	-16	-12	-8	-4	0	4	8	12	16	

5. (i) $5 \times 4 = 20$ (Positive)
(ii) $-6 \times -19 = 114$ (Positive)
(iii) $-15 \times 70 = -1050$ (Negative)
(iv) $128 \times 10 = 1280$ (Positive)
6. (i) $(8 + 9) \times 10 = 17 \times 10 = 170$; $8 + 9 \times 10 = 8 + 90 = 98$, $170 > 98$
(ii) $(8 - 9) \times 10 = -1 \times 10 = -10$;
 $8 - 9 \times 10 = 8 - 90 = -82$;
 $-10 > -82$
(iii) $[(-7) - (3)] \times (-5) = [-7 - 3] \times -5 = -10 \times -5 = 50$
 $(7) - 3 \times (-5) = 7 + 15 = 22$
 $50 > 22$
7. (i) $19 \times [7 + (-3)] = 19 \times 4 = 76$
 $19 \times 7 + 19 \times (-3) = 19 \times (7 - 3) = 19 \times 4 = 76$
 $76 = 76$
(ii) $(-23) \times [(-5) + (+19)] = (-23)[-5 + 19] = -23 \times 14 = -322$
 $(-23) \times (-5) + (-23) \times 19 = 115 - 437 = -322$
 $-322 = -322$
8. $x \times (-3) = 45$; $x = \frac{45}{-3} = -15$; **x is negative.**
9. $x \times (-7) = -56$; $x = \frac{-56}{-7} = 8$; **x is positive.**
10. (i) Let integer is x then, $x \times (-1) = 10$; $x = \frac{10}{-1} = -10$
(ii) Let integer is x then, $x \times (-1) = -35$; $x = \frac{35}{-1} = 35$
(iii) Let integer is x then, $x \times (-1) = 0$; $x = \frac{0}{-1} = 0$.

Learning Target 3.5

1. (i) F (ii) F (iii) T (iv) T
(v) T (vi) F
2. (i) $-18 \div (3) = \frac{-18}{3} = -6$ (ii) $(18) \div (-3) = \frac{18}{-3} = -6$
(iii) $(-18) \div (-3) = \frac{-18}{-3} = 6$ (iv) $36 \div (-9) = \frac{36}{-9} = -4$
(v) $0 \div (-12) = \frac{0}{-12} = 0$ (vi) $(-48) \div (-16) = \frac{-48}{-16} = 3$
(vii) $(-15625) \div (-125) = \frac{-15625}{-125} = 125$

$$\text{(viii)} (-1728) \div 12 = \frac{-1728}{12} = -144$$

$$\text{(ix)} (-729) \div (-81) = \frac{-729}{-81} = 9$$

$$\text{(x)} 10569 \div (-1) = \frac{10569}{-1} = -10569$$

$$\text{(xi)} 17699 \div (-17699) = \frac{17699}{-17699} = -1$$

$$\text{(xii)} 200000 \div (-100) = \frac{200000}{-100} = -2000$$

3. (i) -1 (ii) 281 (iii) 0 (iv) -128
(v) -59 (vi) -756

Learning Target 3.6

1. (i) F (ii) T (iii) T (iv) T
(v) T (vi) F (vii) F (viii) F

2. (i) -2, 3 (ii) 1, 1 (iii) 5, 4 (iv) -6, 1
(v) -27, 2 (vi) 10, 5

3. (i) $10 \times 10 \times 10 = 10^4$

$$\text{(ii)} (-13) \times (-13) \times (-13) \times (-13) \times (-13) \times (-13) = (-13)^6$$

4. (i) $50^2 = 50 \times 50 = 2500$ (ii) $(-1)^{47} = -1$

$$\text{(iii)} 1^{100} = 1 \text{(iv)} (-1)^{20} = 1$$

$$\text{(v)} (-2)^8 = (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) \\ = 256$$

$$\text{(vi)} 2^3 \times 3^2 = 8 \times 9 = 72$$

$$\text{(vii)} 2^3 \times 2^5 = 2^{3+5} = 2^8 = 256$$

$$\text{(viii)} (-2)^6 \div (-2)^2 = (-2)^{6-2} = (-2)^4 = 16$$

$$\text{(ix)} (-4)^5 \div (-4)^2 = (-4)^{5-2} = (-4)^3 = -64$$

$$\text{(x)} (-2)^4 \times (-3)^3 \times (-1) = 16 \times -27 \times -1 = 432$$

$$\text{(xi)} (-1)^3 \times (-10)^2 = -64 = -1 \times 100 = -100$$

$$\text{(xii)} 2^3 \times (-3)^2 \times 8 = 8 \times 9 \times 8 = 576$$

5. (i) $(20)^2 = 20 \times 20 = 400$

$$\text{(ii)} (-100)^2 = -100 \times -100 = 10000$$

$$\text{(iii)} (200)^2 = 200 \times 200 = 40000$$

$$\text{(iv)} 70^2 = 70 \times 70 = 4900$$

$$(v) (-150)^2 = -150 \times -150 = \mathbf{22500}$$

$$(vi) 1000^2 = 1000 \times 1000 = 1000000$$

6. (i) $(-12)^3 = -1728$

(ii) $(-13)^3 = -2197$

(iii) $(-15)^3 = -15 \times -15 \times -15 = -3375$

(iv) $(11)^3 = 11 \times 11 \times 11 = 1331$

(v) $(100)^3 = 100 \times 100 \times 100 = 1000000$

(vi) $(1000)^3 = 1000 \times 1000 \times 1000 = 1000000000$

7. (i) $(1)^4 = 1$

(ii) $2^4 = 2 \times 2 \times 2 \times 2 = 16$

(iii) $3^4 = 3 \times 3 \times 3 \times 3 = 81$

(iv) $(-1)^4 = 1$

(v) $(-2)^4 = 16$

(vi) $(-3)^4 = 81$

8. (i) $(-2)^4 \times (-2)^3 = (-2)^7$

(ii) $10^2 \times 10^3 = 10^5$

(iii) $(-7)^7 \div (-7)^3 = (-7)^{7-3} = (-7)^4 = (7)^4$

(iv) $3^7 \div 3^2 = 3^5$; $3^{7-2} = 3^5$

9. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, unit's digit are 0, 1, 4, 9, 6, 5

10. 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000

11. (i) $3^2 + 4^2 = 5^2$; $9 + 16 = 25 \Rightarrow 25 = 25$

(ii) $8^2 + 6^2 = 10^2$; $64 + 36 = 100 \Rightarrow 100 = 100$

12. (i) $10^2 - 8^2 = 6^2$; $100 - 64 = 36 \Rightarrow 36 = 36$

(ii) $15^2 - 9^2 = 12^2$; $225 - 81 = 144 \Rightarrow 144 = 144$

Learning Target 3.7

1. (i) $28 - 5 \times 6 + 2 = 28 - 30 + 2 = 28 + 2 - 30 = 30 - 30 = \mathbf{0}$

(ii) $120 - 20 \div 2 = 120 - \frac{20}{2} = 120 - 10 = \mathbf{110}$

(iii) $27 + 20 \div 5 = 27 + \frac{20}{5} = 27 + 4 = 31$

(iv) $(-29)(-1) + (-34) + 2 = 29 - 34 + 2 = 31 - 34 = -3$

(v) $17 + (-3) \times (-5) - 6 = 17 + 15 - 6 = 32 - 6 = 26$

(vi) $(-5) - (-48) \div (-16) + (-2) \times 6 = (-5) - \frac{(-48)}{(-16)} + (-2) \times 6$

$$= (-5) - 3 - 12$$

$$= -5 - 3 - 12 = \mathbf{-20}$$

(vii) $(-15) + 4 \div (5 - 3) = (-15) + 4 \div 2 = -15 + 2 = \mathbf{-13}$

(viii) $5 + (10 - 5) = 5 + 5 = 10$

$$(ix) 3 - (5 - 6 \div 3) = 3 - \left(5 - \frac{6}{3}\right) = 3 - (5 - 2) = 3 - 3 = \mathbf{0}$$

$$(x) 36 \div (5 + 7) = 36 \div 12 = \frac{36}{12} = \mathbf{3}$$

$$2. (i) (-40) \text{ of } (-1) + 28 \div 7 = (-40) \times (-1) + \frac{28}{7} = 40 + 4 = \mathbf{44}$$

$$(ii) 28 - 5 \text{ of } 2 + 2 = 28 - 5 \times 2 + 2 = 28 - 10 + 2 = 30 - 10 = \mathbf{20}$$

$$(iii) 7 - \{13 - 2(4 \text{ of } -4)\} = 7 - \{13 - 2(4 \times 4)\} \\ = 7 - \{13 - 2 \times (-16)\} = 7 - (13 + 32) \\ = 7 - 45 = -38$$

$$(iv) 81 \text{ of } [59 - \{7 \times 8 + (13 - 2 \text{ of } 5)\}] = 81 \text{ of } [59 - \{56 + (13 - 10)\}] \\ = 81 \text{ of } [59 - \{56 + 3\}] \\ = 81 \text{ of } [59 - 59] \\ = 81 \text{ of } 0 = 81 \times 0 = \mathbf{0}$$

$$3. (i) 7 - \{13 - 2(4 \times -4)\} - 15 \div 3 \\ = 7 - \{13 - 2 \times (-16)\} - 15 \div 3 \\ = 7 - \{13 + 32\} - 5 \\ = 7 - 13 - 32 - 5 \\ = -\mathbf{43}$$

$$(ii) 20 + \{10 - 5 + (7 - 3)\} = 20 + \{10 - 5 + 4\} = 20 + 9 = \mathbf{29}$$

$$(iii) (-1)\{(-5) + (-25)\} \times (-7) - (8 - 10)(-4) \\ = (-1)(-30) \times (-7) - (8 - 10)(-4) \\ = -210 - 8 = -\mathbf{218}$$

$$(iv) 3[18 + \{3 + 4(4 - 2)\}] = 3[18 + \{3 + 4 \times 2\}] \\ = 3[18 + (3 + 8)] \\ = 3[18 + 11] = 3 \times 29 \\ = \mathbf{87}$$

$$(v) (14 - 7) \times \{8 + (3 + 7 - 1)\} = (7) \times \{8 + 9\} = 7 \times 17 = \mathbf{119}$$

$$(vi) 2 - [2 - \{2 - (2 - 2 - 2)\}] = 2 - [2 - (-2)] \\ = 2 - [2 - \{2 + 2\}] = 2 - [2 - 4] \\ = 2 - [-2] = 2 + 2 = \mathbf{4}$$

$$(vii) 18 + \{1 + (15 - 2) \times 4\} = 18 + \{1 + 13 \times 4\} \\ = 18 + \{1 + 52\} = 18 + 53 \\ = \mathbf{71}$$

$$(viii) 118 - \{121 \div (11 \times 11) - (-4) - (+3 - 7)\} \\ = 118 - \{121 \div 121 + 4 - (-4)\} \\ = 118 - \left\{\frac{121}{121} + 4 + 4\right\} \\ = 118 - \{1 + 8\} = 118 - 9 = \mathbf{109}$$

$$\begin{aligned}
 \text{(ix) } 121 \div [17 - \{15 - 3(7 - 4)\}] &= 121 \div [17 - \{15 - 3 \times (3)\}] \\
 &= 121 \div [17 - \{15 - 9\}] \\
 &= 121 \div [17 - 6] \\
 &= 121 \div 11 = \frac{121}{11} = \mathbf{11}
 \end{aligned}$$

$$\begin{aligned}
 \text{(x) } 15 - (-3)(4 - 4) \div 3[5 + (-3) \times (-6)] \\
 &= 15 - (-3) \times 0 \div 3[5 + (-3) \times (-6)] \\
 &= 15 - 0 \div 3[5 + 18] \\
 &= 15 - 0 \div 3 \times (23) = 15 - 0 = \mathbf{15}
 \end{aligned}$$

Apply Your Mind!

1. (c) 2. (d) 3. (c) 4. (b)
5. (a) Let two integers x and y
 Then, $x + y = 20$
 $x = -5$ (Given)
 $-5 + y = 20$
 $y = 20 + 5 = 25$
 So other integer is **25**.
6. (d)



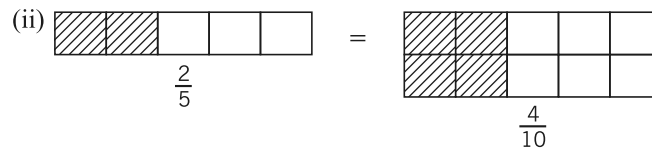
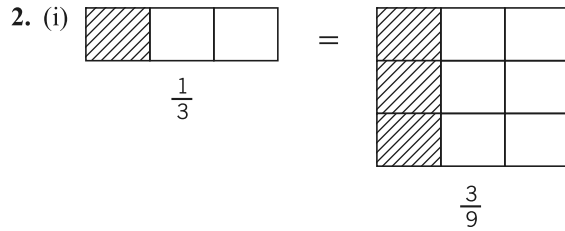
4. Fractions

Learning Target 4.1

1. (i) $\frac{4}{9}$ (ii) $\frac{7}{15}$ (iii) $\frac{4}{5}$ (iv) $\frac{3}{8}$
2. (i) $\frac{2}{5}$ (ii) $\frac{1}{4}$ (iii) $\frac{5}{8}$ (iv) $\frac{7}{10}$
- (v) $\frac{13}{100}$ (vi) $\frac{4}{9}$
3. (i) Four-fifths (ii) Three-sevenths
 (iii) Four-nineteenths (iv) Five elevenths.

Learning Target 4.2

1. $\frac{1}{4}, \frac{2}{8}, \frac{4}{16}$



3. (i) $\frac{3}{5} = \frac{12}{20}$

(iii) $\frac{7}{9} = \frac{105}{135}$

4. (i) $\frac{2}{5} = \frac{8}{20} = \frac{24}{60} = \frac{48}{120}$

5. (i), (iii), (iv)

6. (i) $\frac{2}{3}$

(ii) $\frac{2}{9}$

(v) $\frac{3}{2}$

(vi) $\frac{1}{5}$

(ii) $\frac{150}{750} = \frac{1}{5}$

(iv) $\frac{18}{24} = \frac{3}{4}$

(ii) $\frac{75}{100} = \frac{15}{20} = \frac{3}{4}$

(iii) $\frac{3}{7}$

(iv) $\frac{5}{6}$

Learning Target 4.3

1. (i) $2\frac{1}{3}$ – Mixed fraction,

(iii) $\frac{28}{5}$ = Improper fraction

(v) $\frac{35}{9}$ = Improper fraction

2. (i) $5\frac{6}{7} = \frac{7 \times 5 + 6}{7} = \frac{41}{7}$,

(iii) $1\frac{7}{11} = \frac{11 \times 1 + 7}{11} = \frac{18}{11}$

(v) $8\frac{4}{9} = \frac{9 \times 8 + 4}{9} = \frac{76}{9}$

3. (i) $\frac{17}{4} = 4\frac{1}{4}$

(ii) $\frac{7}{9}$ = Proper fraction

(iv) $\frac{17}{19}$ = Proper fraction

(vi) $\frac{21}{5}$ = Improper fraction

(ii) $7\frac{3}{4} = \frac{7 \times 4 + 3}{4} = \frac{31}{4}$

(iv) $4\frac{3}{5} = \frac{5 \times 4 + 3}{5} = \frac{23}{5}$

(vi) $14\frac{5}{7} = \frac{14 \times 7 + 5}{7} = \frac{103}{7}$

(ii) $\frac{20}{3} = 6\frac{2}{3}$

$$(iii) \frac{25}{5} = 5$$

$$(iv) \frac{34}{7} = 4\frac{6}{7}$$

$$(v) \frac{111}{11} = 10\frac{1}{11}$$

$$(vi) \frac{124}{7} = 17\frac{5}{7}$$

$$4. (i) \frac{2}{7}, \frac{4}{7}, \frac{3}{7} = \frac{2}{7} < \frac{3}{7} < \frac{4}{7}$$

$\frac{2}{7}$ is the smallest fraction

$$(ii) \frac{1}{2}, \frac{1}{4}, \frac{1}{5}$$

LCM of 2, 4, 5 = 20

$$\frac{1 \times 10}{2 \times 10}, \frac{1 \times 5}{4 \times 5}, \frac{1 \times 4}{5 \times 4} \Rightarrow \frac{10}{20}, \frac{5}{20}, \frac{4}{20}$$

$$\frac{4}{20} < \frac{5}{20} < \frac{10}{20} \text{ or } \frac{1}{5} < \frac{1}{4} < \frac{1}{2}$$

$\frac{1}{5}$ is the smallest fraction

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

LCM of 7, 14, 21 = 42

$$\frac{4 \times 6}{7 \times 6}, \frac{5 \times 3}{14 \times 3}, \frac{3 \times 2}{21 \times 2} \Rightarrow \frac{24}{42}, \frac{15}{42}, \frac{6}{42}$$

$$\frac{6}{42} < \frac{15}{42} < \frac{24}{42} \text{ or } \frac{3}{21} < \frac{5}{14} < \frac{4}{7}$$

$\frac{3}{21}$ is the smallest fraction

$$(iv) \frac{5}{9}, \frac{7}{15}, \frac{2}{3}$$

LCM of 9, 15, 3 = 45

$$\frac{5 \times 5}{9 \times 5}, \frac{7 \times 3}{15 \times 3}, \frac{2 \times 15}{3 \times 15} \Rightarrow \frac{25}{45}, \frac{21}{45}, \frac{30}{45}$$

$$\frac{21}{45} < \frac{25}{45} < \frac{30}{45} \text{ or } \frac{7}{15} < \frac{5}{9} < \frac{2}{3}$$

$\frac{7}{15}$ is the smallest fraction

$$5. (i) \frac{3}{7} \text{ and } \frac{5}{7}; \frac{3}{7} < \frac{5}{7}$$

$$(ii) \frac{4}{7} \text{ and } \frac{4}{9}$$

LCM of 7 and 9 = 63

$$\frac{4 \times 9}{7 \times 9} \text{ and } \frac{4 \times 7}{9 \times 7} \Rightarrow \frac{36}{63} > \frac{28}{63} \text{ so, } \frac{4}{7} > \frac{4}{9}$$

$$(iii) \frac{3}{12} \text{ and } \frac{5}{12}; \frac{3}{12} < \frac{5}{12}$$

$$(iv) \frac{5}{12} \text{ and } \frac{1}{3}, \text{ LCM of 12 and 3} = 12$$

$$\frac{5}{12} \text{ and } \frac{1 \times 4}{3 \times 4} \Rightarrow \frac{5}{12} < \frac{4}{12} \text{ so, } \frac{5}{12} > \frac{1}{3}$$

$$(v) \frac{2}{3} \text{ and } \frac{3}{4}; \text{ LCM of 3 and 4} = 12$$

$$\frac{2 \times 4}{3 \times 4} \text{ and } \frac{3 \times 3}{4 \times 3} \Rightarrow \frac{8}{12} < \frac{9}{12} \text{ so, } \frac{2}{3} < \frac{3}{4}$$

$$(vi) \frac{5}{7} \text{ and } \frac{7}{9} \text{ LCM of 7 and 9} = 63$$

$$\frac{5 \times 9}{7 \times 9} \text{ and } \frac{7 \times 7}{9 \times 7} \Rightarrow \frac{45}{63} < \frac{49}{63} \Rightarrow \frac{5}{7} < \frac{7}{9}$$

$$6. (i) \frac{3}{4}, \frac{3}{8}, \frac{5}{12} \text{ LCM of 4, 8 and 12} = 24$$

$$\frac{3 \times 6}{4 \times 6}, \frac{3 \times 3}{8 \times 3}, \frac{5 \times 2}{12 \times 2} \Rightarrow \frac{18}{24}, \frac{9}{24}, \frac{10}{24}$$

fraction in descending order

$$\frac{18}{24} > \frac{10}{24} > \frac{9}{24} \text{ or } \frac{3}{4} > \frac{5}{12} > \frac{3}{8}$$

$$(ii) \frac{2}{3}, \frac{5}{6}, \frac{4}{9} \text{ LCM of 3, 6 and 9} = 18$$

$$\frac{2 \times 6}{3 \times 6}, \frac{5 \times 3}{6 \times 3}, \frac{4 \times 2}{9 \times 2} \Rightarrow \frac{12}{18}, \frac{15}{18}, \frac{8}{18}$$

fraction in descending order

$$\frac{15}{18} < \frac{12}{18} > \frac{8}{18} \text{ or } \frac{5}{6} > \frac{2}{3} > \frac{4}{9}$$

$$(iii) \frac{2}{3}, \frac{4}{7}, \frac{1}{2} \text{ LCM of 3, 7 and 2} = 42$$

$$\frac{2 \times 14}{3 \times 14}, \frac{4 \times 6}{7 \times 6}, \frac{1 \times 21}{2 \times 21} \Rightarrow \frac{28}{42}, \frac{24}{42}, \frac{21}{42}$$

fraction in descending order

$$\frac{28}{42} > \frac{24}{42} > \frac{21}{42} \text{ or } \frac{2}{3} > \frac{4}{7} > \frac{1}{2}$$

$$(iv) \frac{1}{12}, \frac{1}{23}, \frac{1}{5}, \frac{1}{7}, \frac{1}{50}, \frac{1}{9}, \frac{1}{17}$$

$$\frac{1}{5} > \frac{1}{7} > \frac{1}{9} > \frac{1}{12} > \frac{1}{17} > \frac{1}{23} > \frac{1}{50}$$

[∵ If fraction have same numerator, then the larger the denominator, the smaller the fraction]

$$7. (i) \frac{3}{4}, \frac{5}{9}, \frac{5}{6}, \frac{7}{12}$$

$$\frac{3 \times 9}{4 \times 9}, \frac{5 \times 4}{9 \times 4}, \frac{5 \times 6}{6 \times 6}, \frac{7 \times 3}{12 \times 3} \text{ [LCM of 4, 9, 6 and 12 = 36]}$$

$$\frac{27}{36}, \frac{20}{36}, \frac{30}{36}, \frac{21}{36}$$

fraction in amending order

$$\frac{20}{36} < \frac{21}{36} < \frac{27}{36} < \frac{30}{36} \text{ or } \frac{5}{9} < \frac{7}{12} < \frac{3}{4} < \frac{5}{6}$$

$$(ii) \frac{3}{4}, \frac{4}{5}, \frac{7}{10}, \frac{11}{12}$$

$$\frac{3 \times 15}{4 \times 15}, \frac{4 \times 12}{5 \times 12}, \frac{7 \times 6}{10 \times 6}, \frac{11 \times 5}{12 \times 5} \text{ [LCM of 4, 5, 10 and 12 = 60]}$$

$$\frac{45}{60}, \frac{48}{60}, \frac{42}{60}, \frac{55}{60}$$

fraction in ascending order

$$\frac{42}{60} < \frac{45}{60} < \frac{48}{60} < \frac{55}{60} \text{ or } \frac{7}{10} < \frac{3}{4} < \frac{4}{5} < \frac{11}{12}$$

$$(iii) \frac{2}{3}, \frac{5}{12}, \frac{5}{8}, \frac{1}{2}$$

$$\frac{2 \times 8}{3 \times 8}, \frac{5 \times 2}{12 \times 2}, \frac{5 \times 3}{8 \times 3}, \frac{1 \times 12}{2 \times 12} \text{ [LCM of 3, 12, 8 and 2 = 24]}$$

$$\frac{16}{24}, \frac{10}{24}, \frac{15}{24}, \frac{12}{24}$$

fraction in ascending order

$$\frac{10}{24} < \frac{12}{24} < \frac{15}{24} < \frac{16}{24} \text{ or } \frac{5}{12} < \frac{1}{2} < \frac{5}{8} < \frac{2}{3}$$

$$(iv) \frac{3}{7}, \frac{3}{11}, \frac{3}{5}, \frac{3}{2}, \frac{3}{13}, \frac{3}{4}, \frac{3}{17}$$

$$\frac{3}{17} < \frac{3}{13} < \frac{3}{11} < \frac{3}{7} < \frac{3}{5} < \frac{3}{4} < \frac{3}{2}$$

[∵ If fraction have same number ator, then the larger the denominator, the smaller fraction]

Learning Target 4.4

$$1. (i) \frac{21}{50} + \frac{17}{50} + \frac{12}{50} = \frac{21+17+12}{50} = \frac{50}{50} = 1$$

$$(ii) \frac{2}{6} + \frac{1}{6} = \frac{2+1}{6} = \frac{3}{6} = \frac{1}{2}$$

$$(iii) \frac{14}{25} + \frac{6}{25} = \frac{14+6}{25} = \frac{20}{25} = \frac{4}{5}$$

$$(iv) \frac{2}{14} + \frac{9}{14} + \frac{11}{14} = \frac{2+9+11}{14} = \frac{22}{14} = \frac{11}{7}$$

$$2. (i) \frac{5}{8} - \frac{3}{8} = \frac{5-3}{8} = \frac{2}{8} = \frac{1}{4}$$

$$(ii) \frac{7}{9} - \frac{4}{9} = \frac{7-4}{9} = \frac{3}{9} = \frac{1}{3}$$

$$(iii) \frac{23}{30} - \frac{11}{30} = \frac{23-11}{30} = \frac{12}{30} = \frac{2}{5}$$

$$(iv) \frac{37}{49} - \frac{17}{49} - \frac{6}{49} = \frac{37-17-6}{49} = \frac{14}{49} = \frac{2}{7}$$

$$3. (i) \frac{7}{10} + \frac{11}{20} = \frac{7 \times 2}{10 \times 2} + \frac{11}{20} \text{ [LCM of 10, 20 = 20]}$$

$$= \frac{14+11}{20} = \frac{25}{20} = \frac{5}{4}$$

$$(ii) \frac{2}{7} + \frac{3}{6} = \frac{2}{7} + \frac{1}{2} = \frac{2}{7} + \frac{1}{2} \text{ [LCM of 7 and 2 = 14]}$$

$$= \frac{4+7}{14} = \frac{11}{14}$$

$$(iii) \frac{14}{15} - \frac{3}{10} = \frac{14 \times 2}{15 \times 2} - \frac{3 \times 3}{10 \times 3} \text{ [LCM of 15 and 10 = 30]}$$

$$= \frac{28-9}{30} = \frac{19}{30}$$

$$(iv) \frac{19}{30} - \frac{9}{20} = \frac{19 \times 2}{30 \times 2} - \frac{9 \times 3}{20 \times 3} \text{ [LCM of 30 and 20 = 60]}$$

$$= \frac{38-27}{60} = \frac{11}{60}$$

$$4. (i) 6\frac{1}{24} + 3\frac{1}{8} = (6+3) + \left(\frac{1}{24} + \frac{1}{8}\right) = 9 + \left(\frac{1}{24} + \frac{1 \times 3}{8 \times 3}\right) = 9 + \left(\frac{1+3}{24}\right)$$

$$= 9 + \frac{44}{24} = 9 + \frac{11}{6} = 9\frac{11}{6}$$

$$(ii) 6\frac{7}{8} - 3\frac{4}{8} = (6-3) + \left(\frac{7}{8} - \frac{4}{8}\right) = 3 + \left(\frac{7-4}{8}\right) = 3 + \frac{3}{8} = 3\frac{3}{8}$$

$$(iii) 6\frac{2}{3} - 4\frac{1}{4} = (6-4) + \left(\frac{2}{3} - \frac{1}{4}\right) = 2 + \left(\frac{8-3}{12}\right) = 2 + \frac{5}{12} = 2\frac{5}{12}$$

$$(iv) 9\frac{2}{5} - 5\frac{1}{3} = (9-5) + \left(\frac{2}{5} - \frac{1}{3}\right) = 4 + \left(\frac{6-5}{15}\right) = 4 + \frac{1}{15} = 4\frac{1}{15}$$

Learning Target 4.5

$$1. \quad 12 - [9 - \{15 - (12 - 9 - 5)\}] = 12 - [9 - \{15 - (12 - 4)\}] \\ = 12 - [9 - \{15 - 8\}] \\ = 12 - [9 - 7] = 12 - 2 = \mathbf{10}$$

$$2. \quad 3 \div [3 \text{ of } \{15 - (2 + 3)\}] = 3 \div [3 \times \{15 - 5\}] \\ = 3 \div [3 \times 10] = \frac{3}{30} = \frac{1}{10}$$

$$3. \quad 11\frac{3}{4} \div \left[5\frac{1}{6} + \left\{3\frac{1}{2} - \left(1\frac{2}{3} + \frac{3}{2}\right)\right\}\right] \\ = \frac{47}{4} \div \left[\frac{31}{6} + \left\{2 - \left(\frac{19}{6}\right)\right\}\right] = \frac{47}{4} \div \left[\frac{31}{6} + \left\{\frac{21-19}{6}\right\}\right] \\ = \frac{47}{4} \div \left[\frac{31}{6} + \frac{2}{6}\right] = \frac{47}{4} \div \left[\frac{31+2}{6}\right] \\ = \frac{47}{4} \div \frac{33}{6} = \frac{47}{4} \times \frac{6}{33} \\ = \frac{47}{4} \times \frac{2}{11} = \frac{47}{2} \times \frac{1}{11} = \frac{47}{22} = \mathbf{2\frac{3}{22}}$$

$$4. \quad 5\frac{1}{12} - \left[12\frac{1}{2} - \left\{3\frac{3}{4} \text{ of } \left(5\frac{1}{3} - 4\frac{1}{6} - 3\frac{4}{5}\right)\right\}\right] \\ = \frac{61}{12} - \left[\frac{25}{2} - \left\{\frac{15}{4} \times (5 - 4 - 3) + \left(\frac{1}{3} - \frac{1}{6} - \frac{4}{5}\right)\right\}\right] \\ = \frac{61}{12} - \left[\frac{25}{2} - \left\{\frac{15}{4} \times (-2) + \left(\frac{10-5-24}{30}\right)\right\}\right] \\ = \frac{61}{12} - \left[\frac{25}{2} - \left\{\frac{15}{4} \times \left(-\frac{60-19}{30}\right)\right\}\right] \\ = \frac{61}{12} - \left[\frac{25}{2} + \frac{79}{8}\right] = \frac{61}{12} - \left[\frac{100+79}{8}\right] = \frac{61}{12} - \frac{179}{8} \\ = \frac{122-537}{24} = \frac{-415}{24} = -17\frac{7}{24}$$

$$\begin{aligned}
5. \quad & 3\frac{1}{10} - \left[7\frac{1}{2} - \left\{ \frac{7}{10} - \left(\frac{5}{6} - \frac{2}{3} - \frac{1}{9} \right) \right\} \right] \\
&= \frac{31}{10} - \left[\frac{15}{2} - \left\{ \frac{7}{10} - \left(\frac{15-12-2}{18} \right) \right\} \right] \\
&= \frac{31}{10} - \left[\frac{15}{2} - \left\{ \frac{7}{10} - \frac{1}{18} \right\} \right] \\
&= \frac{31}{10} - \left[\frac{15}{2} - \left[\frac{63-5}{90} \right] \right] = \frac{31}{10} - \left[\frac{15}{2} - \frac{58}{90} \right] \\
&= \frac{31}{10} - \left(\frac{675-58}{90} \right) = \frac{31}{10} - \frac{617}{90} \\
&= \frac{279-617}{90} = \frac{-338}{90} = \frac{-169}{45} = -3\frac{34}{45}
\end{aligned}$$

$$\begin{aligned}
6. \quad & 4\frac{1}{2} - \left[5\frac{1}{4} \div \left\{ 2\frac{1}{2} - \frac{1}{12} \text{ of } \left(\frac{5}{2} \right) \right\} \right] \\
&= \frac{9}{2} - \left[\frac{21}{4} \div \left\{ \frac{5}{2} - \frac{1}{12} \times \frac{5}{2} \right\} \right] = \frac{9}{2} - \left[\frac{21}{4} \div \left\{ \frac{5}{2} - \frac{5}{24} \right\} \right] \\
&= \frac{9}{2} - \left[\frac{21}{4} \div \left\{ \frac{60-5}{24} \right\} \right] \\
&= \frac{9}{2} - \left[\frac{21}{4} \times \frac{24}{55} \right] = \frac{9}{2} - \left[\frac{21}{1} \times \frac{6}{55} \right] = \frac{9}{2} - \left[\frac{126}{55} \right] \\
&= \frac{495-252}{110} = \frac{243}{110} = 2\frac{23}{110}
\end{aligned}$$

$$\begin{aligned}
7. \quad & \left(2\frac{1}{3} - 1\frac{2}{3} \right) \text{ of } \left[7 + \left\{ \frac{46}{9} - \left(6 - \frac{2-3}{6} \right) \right\} \right] \\
&= \left(\frac{7}{3} - \frac{5}{3} \right) \times \left[7 + \left\{ \frac{46}{9} - \left(6 - \frac{2-3}{6} \right) \right\} \right] \\
&= \frac{2}{3} \times \left[7 + \left\{ \frac{46}{9} - \left(6 + \frac{1}{6} \right) \right\} \right] \\
&= \frac{2}{3} \times \left[7 + \left\{ \frac{46}{9} - \frac{37}{6} \right\} \right] \\
&= \frac{2}{3} \times \left[7 + \left\{ \frac{92-111}{18} \right\} \right] = \frac{2}{3} \times \left[7 - \frac{19}{18} \right] \\
&= \frac{2}{3} \times \frac{126-19}{18} = \frac{1}{3} \times \frac{107}{9} = \frac{107}{27} = 3\frac{26}{27}
\end{aligned}$$

$$\begin{aligned}
8. \quad & 8\frac{1}{4} \text{ of } \left[5\frac{1}{2} - \frac{1}{3} \text{ of } \left(2\frac{2}{3} - 1\frac{1}{2} \right) \right] \\
&= \frac{33}{4} \text{ of } \left[\frac{11}{2} - \frac{1}{3} \text{ of } \left(\frac{8}{3} - \frac{3}{2} \right) \right] \\
&= \frac{33}{4} \text{ of } \left[\frac{11}{2} - \frac{1}{3} \text{ of } \left(\frac{16-9}{6} \right) \right] \\
&= \frac{33}{4} \times \left[\frac{11}{2} - \frac{1}{3} \times \frac{7}{6} \right] = \frac{33}{4} \times \left[\frac{99-7}{18} \right] \\
&= \frac{11 \times 92}{4 \times 6} = \frac{11 \times 23}{6} = \frac{253}{6} = 42\frac{1}{6}
\end{aligned}$$

$$\begin{aligned}
9. \quad & 21\frac{1}{9} \div \left[\frac{5}{9} \text{ of } \left\{ 3\frac{1}{27} - \left(6 - \frac{1}{3} - \frac{1}{6} \right) \right\} \right] \\
&= \frac{190}{9} \div \left[\frac{5}{9} \text{ of } \left\{ \frac{82}{27} - \left(6 - \frac{2-1}{6} \right) \right\} \right] \\
&= \frac{190}{9} \div \left[\frac{5}{9} \text{ of } \left\{ \frac{82}{27} - \left(6 - \frac{1}{6} \right) \right\} \right] \\
&= \frac{190}{9} \div \left[\frac{5}{9} \text{ of } \left\{ \frac{82}{27} - \frac{35}{6} \right\} \right] \\
&= \frac{190}{9} \div \left[\frac{5}{9} \text{ of } \left\{ \frac{164-315}{54} \right\} \right] \\
&= \frac{190}{9} \div \left[\frac{5}{9} \times \left(\frac{-151}{54} \right) \right] \\
&= \frac{190}{9} \div \left[\frac{-755}{486} \right] = \frac{190}{9} \times \left(\frac{-486}{755} \right) = \frac{38}{1} \times \left(\frac{-54}{151} \right) \\
&= \frac{38 \times (-54)}{151} = -\frac{2052}{151} = -13\frac{89}{151}
\end{aligned}$$

Apply Your Mind!

1. (a) $\frac{3}{4} = \frac{x}{20} \Rightarrow \frac{3 \times 20}{4} \Rightarrow x = 15$ 2. (b) $\frac{7}{15}$

3. (d) None of these

4. (c) $\frac{3}{5}, \frac{2}{3}, \frac{5}{6}, \frac{7}{10}$
 $\frac{3 \times 6}{5 \times 6}, \frac{2 \times 10}{3 \times 10}, \frac{5 \times 5}{6 \times 5}, \frac{7 \times 3}{10 \times 3}$

$$\frac{18}{30}, \frac{20}{30}, \frac{25}{30}, \frac{21}{30}$$

$$\frac{18}{30} < \frac{20}{30} < \frac{21}{30} < \frac{25}{30} \text{ or } \frac{3}{5} < \frac{2}{3} < \frac{7}{10} < \frac{5}{6}$$

smallest fraction $\frac{3}{5}$

5. (b) Length of telegraph post = $5\frac{1}{2}$ m

Length of post that set into the ground = $1\frac{1}{5}$ m

$$= \frac{11}{2} \text{ m} - \frac{6}{5} \text{ m}$$

LCM of 2, 5 is 10 = $\frac{11}{2} \times \frac{5}{5} \text{ m} - \frac{6}{5} \times \frac{2}{2}$

$$= \frac{55}{10} \text{ m} - \frac{12}{10} \text{ m}$$

$$= \frac{55\text{m} - 12\text{m}}{10} = \frac{43}{10} \text{ m} = 4\frac{3}{10}$$

6. (a) $3\frac{3}{4} - 2\frac{1}{4} = \frac{15}{4} - \frac{9}{4} = \frac{15-9}{4} = \frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$

□

5. Decimals

Learning Target 5.1

1. (i) $\frac{59}{1000} = 0.059$ (ii) $\frac{81}{100} = 0.81$
- (iii) $\frac{9}{1000} = 0.009$ (iv) $\frac{15}{20} = \frac{15 \times 5}{20 \times 5} = \frac{75}{100} = 0.75$
- (v) $\frac{17}{4} = \frac{17 \times 25}{4 \times 25} = \frac{425}{100} = 4.25$
- (vi) $2\frac{3}{10} = 2 + \frac{3}{10} = 2 + 0.3 = 2.3$
- (vii) $58\frac{3}{25} = 58 + \frac{3 \times 4}{25 \times 4} = 58 + \frac{12}{100} = 58 + 0.12$
- (viii) $4\frac{31}{50} = 4 + \frac{31 \times 2}{50 \times 2} = 4 + \frac{62}{100} = 4 + 0.62 = 4.62$

$$(ix) 17\frac{3}{20} = 17 + \frac{3 \times 5}{20 \times 5} = 17 + \frac{15}{100} = 17 + 0.15 = 17.15$$

$$(x) 101\frac{11}{10000} = 101 + \frac{11}{10000} = 101 + 0.0011 = 101.0011$$

$$(xi) 85\frac{3}{25} = 85 + \frac{3 \times 4}{25 \times 4} = 85 + \frac{12}{100} = 85 + 0.12 = 85.12$$

$$(xii) 23\frac{6}{25} = 23 + \frac{6 \times 4}{25 \times 4} = 23 + \frac{24}{100} = 23 + 0.24 = 23.24$$

$$2. (i) 0.63 = \frac{63}{100}$$

$$(ii) 0.75 = \frac{75}{100} = \frac{3}{4}$$

$$(iii) 0.025 = \frac{25}{1000} = \frac{1}{40}$$

$$(iv) 0.006 = \frac{6}{1000} = \frac{3}{500}$$

$$(v) 0.105 = \frac{105}{1000} = \frac{21}{200}$$

$$(vi) 3.75 = \frac{375}{100} = \frac{15}{4}$$

$$(vii) 0.0125 = \frac{125}{10000} = \frac{1}{80}$$

$$(viii) 15.52 = \frac{1552}{100} = \frac{776}{50} = \frac{388}{25}$$

Learning Target 5.2

$$1. (i) \begin{array}{r} 14.050 \\ 0.031 \\ 123.169 \\ + 7.500 \\ \hline 144.750 \end{array}$$

$$(ii) \begin{array}{r} 69.2 \\ 14.7 \\ 15.0 \\ + 9.5 \\ \hline 108.4 \end{array}$$

$$(iii) \begin{array}{r} 23.70 \\ 105.94 \\ 69.70 \\ + 11.01 \\ \hline 210.35 \end{array}$$

$$(iv) \begin{array}{r} 4.37 \\ 9.683 \\ 17.07 \\ + 17.021 \\ \hline 48.144 \end{array}$$

$$(v) \begin{array}{r} 28.9 \\ 19.64 \\ 111.50 \\ + 313.192 \\ \hline 473.232 \end{array}$$

$$(vi) \begin{array}{r} 8.235 \\ 68.31 \\ 25.317 \\ + 19.032 \\ \hline 120.894 \end{array}$$

$$2. (i) \begin{array}{r} 70.610 \\ - 38.857 \\ \hline 31.753 \end{array}$$

$$(ii) \begin{array}{r} 901.537 \\ - 843.235 \\ \hline 58.302 \end{array}$$

$$(iii) \begin{array}{r} 302.13 \\ - 94.68 \\ \hline 207.45 \end{array}$$

$$(iv) \begin{array}{r} 70.010 \\ - 39.578 \\ \hline 30.432 \end{array}$$

$$(v) \begin{array}{r} 500.000 \\ - 85.356 \\ \hline 414.644 \end{array}$$

$$(vi) \begin{array}{r} 1.0000 \\ - 0.1246 \\ \hline 0.8754 \end{array}$$

$$3. (i) \text{ ₹ } 7 \text{ and paise } 5 = \text{ ₹ } 7.05$$

$$(ii) \text{ ₹ } 13 \text{ and paise } 50 = \text{ ₹ } 13.50$$

$$(iii) 3 \text{ kg and } 750 \text{ gm} = 3.750 \text{ kg}$$

$$(iv) 3 \text{ kg and } 5 \text{ g} = 3.005 \text{ kg}$$

(v) 7 and 725 m = 7.725 km

(vi) $500 \text{ m} = \frac{500}{1000} \text{ km} = 0.5 \text{ km}$

4. (i) $76.3 + 15.7 - 13.3 + 4.1 = 76.3 + 15.7 + 4.1 - 13.3 = 96.1 - 13.3 = 82.8$

(ii) $75.3 + 113.01 - 97.184 = 188.31 - 97.184 = 91.126$

(iii) $231.75 - 84.54 + 31.517 - 13.172$
 $= 231.75 + 31.517 - 84.54 - 13.172$
 $= 263.267 - 97.712$
 $= 165.555$

(iv) $76.8 - 7.13 - 5.333 = 76.8 - 12.463 = 64.337$

(v) $348.237 + 523.12 - 123.7 - 412.780$
 $= 871.357 - 536.48$
 $= 334.877$

(vi) $39.875 + 70.68 - 56.8 = 110.555 - 56.8 = 53.755$

5. (i) Weight of purchasing apples = 5 kg and 50 g
Weight of purchasing grapes = 2 kg and 300 g
Weight of purchasing guavas = 2 kg and 10 g

=	5 kg	50 g
=	2 kg	300 g
=	2 kg	10 g
=	5 kg	50 g
=	2 kg	300 g
=	2 kg	10 g
=	9 kg	360 g

Total weight of the fruits

Total Weight of the fruits is 9 kg 360 g.

Difference between 10 kg and total weight of the fruits.

$$= 10 \text{ kg} - 9 \text{ kg } 360 \text{ g}$$
$$= 10000 \text{ g} - 9360 \text{ g} = \mathbf{640 \text{ g}}$$

Remaining weight of the fruits is 0.640 kg.

(ii) Price of a notebook = ₹ 21.50

Price of a pencil = ₹ 2.75

Price of a book = ₹ 32.05

Then total price = ₹ (21.50 + 2.75 + 32.05) = ₹ 56.30

If the price is paid by ₹ 100 note then change will be

$$= ₹ (100 - 56.30) = ₹ \mathbf{43.70}$$

□

6.

Algebra

Learning Target 6.1

1. (i) $\frac{1}{2}$ of $(x + y) = \frac{x + y}{2}$

(ii) The sum of 6 and $x = 6 + x$

- (iii) $x - 7$ (iv) $y + 3$
 (v) $7 - y$ (vi) 2 less than $\frac{x}{y} = \frac{x}{y} - 2$
 (vii) 3 more than $2x = 2x + 3$ (viii) $x \times x = x^2$
 (ix) 5 times to $z = 5z$ (x) $\frac{1}{3}$ of $x = \frac{x}{3}$
 2. (i) 3 more than $x = x + 3$ (ii) 5 less than $z = z - 5$
 (iii) The sum of z and $2 = z + 2$
 (iv) $x + 4$ its becomes z
 $x + 4 = z$
 (v) $x - 4$ its becomes z
 $x - 4 = z$
 3. (i) The sum of cost price and profit = selling price $C + P = S$
 [Where C = cost price, P = profit, S = selling price]
 (ii) The sum of principal and interest = Amount $P + I = A$
 [Where P = principal, I = Interest, A = Amount]



7. Ratio and Proportion and Unitary Method

Learning Target 7.1

1. (i) Number of villages is 2000 times that of cities in India.
 (ii) Number of students passing an examination is $\frac{4}{5}$ of the number that appeared.
 (iii) Number of bad pencils produced in a factory is $\frac{1}{9}$ of the number of good pencils produced in the factory.
 (iv) Quantity of acid in the diluted acid is $\frac{2}{5}$ of the water.
2. (i) Ratio of the number of classes to the number of teachers is 4 : 6.
 (ii) Ratio of length to breadth is 2 : 1.
 (iii) Ratio of the number of girls to that of boys in the merit list is 2 : 1
 (iv) Ratio of the number of students passing a mathematics test to that of total students appearing in the test is 2 : 3

3. (i) $160000 : 12000 \Rightarrow 40 : 3$
(ii) $12000 : 16000 \Rightarrow 3 : 40$
4. Lecturer's earning = ₹ 14000
Wife Daizy's earning = ₹ 18000
∴ Total earning = ₹ (14000 + 18000) = ₹ 32000
(i) $14000 : 32000 \Rightarrow 7 : 16$ (ii) $18000 : 32000 \Rightarrow 9 : 16$
5. Earning = ₹ 9550
Saving = ₹ 1850
Expenditure = ₹ (9550 - 1850) = ₹ 7700
(i) $1850 : 9550 \Rightarrow 37 : 191$ (ii) $9550 : 7700 \Rightarrow 191 : 154$
(iii) $1850 : 7700 \Rightarrow 37 : 154$
6. Men = 56
Women = $144 - 56 = 88$
(i) Ratio of men to women = $56 : 88 = 7 : 11$
(ii) Ratio of men to total person = $56 : 144 = 7 : 18$
(iii) Ratio of women to total person = $88 : 144 = 11 : 18$
7. $42 : 12 \times 100 \Rightarrow 42 : 120 \Rightarrow 7 : 20$
8. Speed = $\frac{\text{Distance}}{\text{Time}}$
Speed of car = $\frac{135}{3} = 45 \text{ km/h}$
Speed of train = $\frac{170}{2} = 85 \text{ km/h}$
Ratio of their speeds = $\frac{45}{85} = 45 : 85 = 9 : 17$

Learning Target 7.2

1. (i) 1:4 or 7:20 LCM of 4 and 20 = 20
 $1:4 = \frac{1}{4} = \frac{1 \times 5}{4 \times 5} = \frac{5}{20}$ $7:20 = \frac{7}{20}$; $\frac{5}{20} < \frac{7}{20}$ or $\frac{1}{4} < \frac{7}{20}$
- (ii) 13:4 or 63:20 LCM of 4 and 20 = 20
 $13:4 = \frac{13 \times 5}{4 \times 5} = \frac{65}{20}$ and $63:20 = \frac{63}{20} \Rightarrow \frac{65}{20} > \frac{63}{20}$ or $\frac{13}{4} > \frac{63}{20}$
- (iii) 19:10 or 9:5 LCM of 10 and 5 = 10
 $\Rightarrow 19:10 = \frac{19}{10}$ and $9:5 = \frac{9 \times 2}{5 \times 2} = \frac{18}{10}$; $\frac{19}{10} > \frac{18}{10}$ or $\frac{19}{10} > \frac{9}{5}$

$$(iv) 26:5 \text{ or } 13:2 \text{ LCM of } 5 \text{ and } 2 = 10 \Rightarrow 26:5 = \frac{26 \times 2}{5 \times 2} = \frac{52}{10}$$

$$\text{and } 13:2 = \frac{13 \times 5}{2 \times 5} = \frac{65}{10} \Rightarrow \frac{52}{10} < \frac{65}{10} \text{ or } \frac{26}{5} < \frac{13}{2}$$

$$2. (i) 2:3 = \frac{2 \times 2}{3 \times 2} = \frac{4}{6} = 4:6 \quad (ii) 27:30 = \frac{27 \div 3}{30 \div 3} = \frac{9}{10} = 9:10$$

$$(iii) 16:24 = \frac{16 \div 4}{24 \div 4} = \frac{4}{6}$$

$$3. (i) 4:3, 5:4 \text{ and } 6:7$$

$$\text{or } \frac{4}{3}, \frac{5}{4}, \frac{6}{7} \text{ and } \frac{112}{84}, \frac{105}{84} \text{ and } \frac{72}{84}$$

$$\text{Hence } \frac{72}{84} < \frac{105}{84} < \frac{112}{84} \text{ are in ascending order.}$$

$$\frac{6}{7} < \frac{5}{4} < \frac{4}{3} \text{ are in ascending order.}$$

$$(ii) 15:27, 27:30 \text{ and } 30:40 \text{ or } \frac{15}{27}, \frac{27}{30} \text{ and } \frac{30}{40}$$

$$\frac{5}{9}, \frac{9}{10} \text{ and } \frac{3}{4}$$

$$\frac{100}{180}, \frac{144}{180} \text{ and } \frac{135}{180} \Rightarrow \frac{100}{180} < \frac{135}{180} < \frac{144}{180} \text{ are in ascending order}$$

$$\text{So, } \frac{15}{27} < \frac{30}{40} < \frac{27}{30} \text{ or } 15:27 < 30:40 < 27:30$$

$$4. \text{ According to question } 5x + 3x = 968$$

$$8x = 968$$

$$x = \frac{968}{8} = 121$$

$$\text{So, No. of boys} = 121 \times 5 = \mathbf{605}$$

$$\text{No. of girls} = 121 \times 3 = \mathbf{363}$$

$$5. \text{ Let priya's share} = 3x \text{ and Meenu share} = 7x$$

$$\text{According to question, } 3x + 7x = 1500 \Rightarrow 10x = 1500$$

$$x = \frac{1500}{10}$$

$$x = 150$$

$$\text{Priya's share} = 3 \times 150 = \mathbf{₹ 450}$$

$$\text{Meenu's share} = 7 \times 150 = \mathbf{₹ 1050}$$

$$6. \text{ Let Rakesh's share} = 7x, \text{ Lokesh's share} = 2x$$

$$\text{and Mukesh's share} = 3x$$

According to question, $7x + 3x + 2x = 3600 \Rightarrow 12x = 3600$

$$x = \frac{3600}{12} \Rightarrow x = ₹ 300$$

So, Rakesh's share = $7 \times 300 = ₹ 2100$

Lokesh's share = $2 \times 300 = ₹ 600$

Mukesh's share = $3 \times 300 = ₹ 900$

7. Let Peter's age = x years

Peter's father age = $3x$

The ratio of Peter's and his father's age = $x : 3x = 1 : 3$

8. Let Carla's age is $7x$

then, Tina's age is $11x$

According to question $11x = 55$

$$x = \frac{55}{11} = 5$$

So Carla's age = $7 \times 5 = 35$ years.

9. An apple cost ₹ $\frac{200}{12}$

An orange cost = ₹ $\frac{80}{10}$

$$\begin{aligned} \text{Ratio of apple and oranges costs} &= \frac{200}{12} : \frac{80}{10} \\ &= \frac{5}{12} : \frac{2}{10} = \frac{50}{120} : \frac{24}{120} = 25 : 12 \end{aligned}$$

So, ratio in apple and orange cost = 25 : 12

Learning Target 7.3

1. (i) $16 : 24 = 20 : 30$

$$\frac{16}{24} = \frac{20}{30} \Rightarrow \frac{2}{3} = \frac{2}{3}$$

So, it is **true**.

$$(ii) 21 : 6 = 35 : 10 \Rightarrow \frac{21}{6} = \frac{35}{10} \Rightarrow \frac{7}{2} = \frac{7}{2} \text{ (True)}$$

$$(iii) 12 : 18 = 28 : 12 \Rightarrow \frac{12}{18} = \frac{28}{12} \Rightarrow \frac{2}{3} = \frac{7}{3} \text{ (False)}$$

$$(iv) 8 : 9 = 24 : 27 \Rightarrow \frac{8}{9} = \frac{24}{27} \Rightarrow \frac{8}{9} = \frac{8}{9} \text{ (False)}$$

$$(v) 0.9 : 0.36 = 5 : 2 \Rightarrow \frac{0.9}{0.36} = \frac{5}{2} \Rightarrow \frac{90}{36} = \frac{5}{2} \Rightarrow \frac{5}{2} = \frac{5}{2} \text{ (True)}$$

- (vi) $5.2 : 3.9 = 3 : 4 \Rightarrow \frac{5.2}{3.9} = \frac{3}{4} \Rightarrow \frac{4}{3} = \frac{3}{4}$ (False)
- (vii) $8 : 27 = 9 : 24 \Rightarrow \frac{8}{27} = \frac{9}{24} \Rightarrow \frac{8}{27} = \frac{3}{8}$ (False)
- (viii) 40 persons : 200 persons = ₹ 15 : ₹ 75
 $\Rightarrow \frac{40}{200} = \frac{15}{75} \Rightarrow \frac{1}{5} = \frac{1}{5}$ (True)
- (ix) 3 kg : 7 kg = ₹ 14 : ₹ 6 $\Rightarrow \frac{3}{7} = \frac{14}{6} \Rightarrow \frac{3}{7} = \frac{7}{3}$ (False)
- (x) 99 kg : 45 kg = ₹ 44 : ₹ 20 $\Rightarrow \frac{99}{45} = \frac{44}{20} \Rightarrow \frac{11}{5} = \frac{11}{5}$ (True)

2. (i) 2, 3, 4, 5

Now product of extremes = $2 \times 5 = 10$

Product of means = $3 \times 4 = 12$

Since the product of extremes are not equal the product of means.

So, 2, 3, 4 and 5 are not in proportion.

(ii) 4, 6, 8, 10

Product of extremes = $4 \times 10 = 40$

Product of means = $6 \times 8 = 48$

Product of extremes are not equal product of means.

So, 4, 6, 8 and 10 are not in proportion.

(iii) 4, 6, 8, 12

Product of extremes = $4 \times 12 = 48$

Product of means = $6 \times 8 = 48$

Product of extremes and product of means are equal.

So, 4, 6, 8, 12 are in proportion.

(iv) 20, 45, 70, 95

Product of extremes = $20 \times 95 = 1900$

Product of means = $45 \times 70 = 2150$

Product of extremes and product of means are not equal.

So, 20, 45, 70, 95 are not in proportion.

(v) 15, 45, 75, 125

Product of extremes = $15 \times 125 = 1875$

Product of means = $45 \times 75 = 3375$

Product of extremes and product of means are not equal.

So, 15, 45, 75, 125 are not in proportion.

(vi) 33, 44, 75, 150

Product of extremes = $33 \times 150 = 4950$

Product of means = $44 \times 75 = 3300$

Product of extremes and product of means are of equal.

So, 33, 44, 75, 150 are not in proportion.

3. (i) 20 cm : 1 m and 3.5 : 17.5

$$20 \text{ cm} : 1 \text{ m} = \frac{20 \text{ cm}}{100 \text{ cm}} = \frac{1}{5}$$

$$3.5 : 17.5 = \frac{3.5}{17.5} = \frac{1}{5}$$

$$\frac{1}{5} = \frac{1}{5} \text{ or } 20 \text{ cm} : 1 \text{ m} = 3.5 : 17.5$$

So, 20 cm : 1 m and 3.5 : 17.5 are in proportion

(ii) 2 kg : 80 kg and 25 g : 625 g

$$2 \text{ kg} : 80 \text{ kg} = \frac{2}{80} = \frac{1}{40}$$

$$25 \text{ g} : 625 \text{ g} = \frac{25}{625} = \frac{1}{25} \Rightarrow \frac{1}{40} \neq \frac{1}{25}$$

$$\Rightarrow 2 \text{ kg} : 80 \text{ kg} \neq 25 \text{ g} : 625 \text{ g}$$

So, 2 kg : 80 kg and 25 g : 625 g are not in proportion

(iii) 200 mL : 2.5 L and ₹ 4 : ₹ 50

$$200 \text{ mL} : 2.5 \text{ L} = \frac{200}{2.5 \times 1000} = \frac{2}{25}$$

$$₹ 4 : ₹ 50 = \frac{4}{50} = \frac{2}{25} \Rightarrow \frac{2}{25} = \frac{2}{25}$$

So, 200 mL : 2.5 L and ₹ 4 : ₹ 50 are in proportion.

(iv) 650 m : 1 km and 65 cm : 1 m

$$650 \text{ m} : 1 \text{ km} = \frac{650}{1000} = \frac{13}{20}$$

$$65 \text{ cm} : 1 \text{ m} = \frac{65}{100} = \frac{13}{20} \Rightarrow \frac{13}{20} = \frac{13}{20}$$

$$650 \text{ m} : 1 \text{ cm} = 65 \text{ cm} : 1 \text{ m}$$

So, 650 m : 1 cm and 65 cm : 1 m are in proportion.

4. (i) 28, \square , 3.5, 1.5

$$\text{Let } \square = x$$

$$\text{Now product of extremes} = 28 \times 1.5 = 42$$

$$\text{Product of means} = x \times 3.5$$

$$\text{According to question } x \times 3.5 = 42$$

$$x = \frac{42}{3.5} = \mathbf{12}$$

(ii) 80, 64, \square , 24

$$\text{Let } \square = x$$

$$\text{Product of extremes} = 80 \times 24 = 1920$$

$$\text{Product of means} = 64 \times x$$

According to question $64 \times x = 1920 \Rightarrow x = \frac{1920}{64}$

$$x = 30$$

(iii) $\square, 35, 3, 15$

Let $\square = x$

Product of extremes = $x \times 15$

Product of means = 35×3

According to question, $x \times 15 = 35 \times 3$

$$\Rightarrow x = \frac{35 \times 3}{15} = 7$$

$$x = 7$$

(iv) $15, 45, \square, 135$

Let $\square = x$

Product of extremes = 15×135

Product of means = $45 \times x$

According to question $45 \times x = 15 \times 135$

$$\Rightarrow x = \frac{15 \times 135}{45} \Rightarrow x = 45$$

5. Let fourth terms is x

Now product of extreme = $7 \times x$

and product of means = 14×25

According to question = $7 \times x = 14 \times 25$

$$x = \frac{14 \times 25}{7} = 50$$

So, fourth term = 50

6. (i) $32 \text{ m} : \square = 6 : 12 \Rightarrow \frac{32 \text{ m}}{\square} = \frac{6}{12} \Rightarrow \square = 64 \text{ m}$

(ii) $22 \text{ kg} : 26 \text{ kg} = \square : 260 \text{ m} \Rightarrow \frac{22 \text{ kg}}{26 \text{ kg}} = \frac{\square}{260 \text{ m}} \Rightarrow \square = 220 \text{ m}$

(iii) $45 \text{ km} : 60 \text{ km} = \square : 16 \text{ hours} \Rightarrow \frac{45 \text{ km}}{60 \text{ km}} = \frac{\square}{16 \times \text{hour}}$

$$= \square = \frac{3 \times 16}{4} = 12 \text{ hours}$$

(iv) $2 : 17 = \square : 34 \text{ girls} \Rightarrow \frac{2}{17} = \frac{\square}{34 \text{ girls}} \Rightarrow \square = 4 \text{ girls}$

(v) $30 \text{ boys} : 45 \text{ boys} = 16 \text{ girls} : \square \Rightarrow \frac{30}{45} = \frac{16}{\square}$

$$\Rightarrow \square = \frac{16 \times 3}{2} = 24 \text{ girls}$$

7. Let the third term is x .

$$\text{Product of extremes} = 75 \times 3$$

$$\text{Product of means} = x \times 15$$

$$\text{According to question } x \times 15 = 75 \times 3$$

$$\Rightarrow x = \frac{75 \times 3}{15} = 15$$

$$x = 15$$

So, third term = 15

8. (i) 25, 35, \square

$$\text{Let } \square = x.$$

$$\text{then } 25 \times x = 35 \times 35$$

$$x = \frac{35 \times 35}{25} = 49.$$

(ii) \square , 32, 64

$$\text{Let } \square = x$$

$$\text{then } x \times 64 = 32 \times 32$$

$$x = \frac{32 \times 32}{64} = 16$$

(iii) 6, 18, $\square \Rightarrow$ Let $\square = x$

$$\text{then } 6 \times x = 18 \times 18 \Rightarrow x = \frac{18 \times 18}{6} = 54$$

(iv) \square , 12, 48 \Rightarrow Let $\square = x$

$$\text{then } x \times 48 = 12 \times 12 \Rightarrow x = \frac{12 \times 12}{48} \Rightarrow x = 3$$

9. 9, 57 and x are in proportion

$$9 \times x = 57 \times 57 \Rightarrow x = \frac{57 \times 57}{9}$$

$$x = 19 \times 19 \Rightarrow x = 361$$

10. If 25, 10 and 4 are in proportion

$$\text{then } 25 \times 4 = 100 = (10)^2 = 10 \times 10 \text{ (middle term)}$$

Yes, 25, 10 and 4 are in proportion.

Learning Target 7.4

1. \therefore 8 water tankers are filled $7\frac{1}{2} = \frac{15}{2}$ hrs

\therefore 1 water tanker will be filled $\frac{15}{2 \times 8}$ hrs

\therefore 16 water tankers will be filled $\frac{15}{16} \times 16 = 15$ hrs

2. \therefore Cost of 15 post cards = ₹ 7.50
 Cost of 1 post cards = $\frac{7.50}{15} = ₹ 0.5$
 \therefore Cost of 36 post cards = $0.5 \times 36 = ₹ 18$
3. \therefore Cost of 30 metres of cloth = ₹ 2550
 \therefore Cost of 1 metre of cloth = $₹ \frac{2550}{30} = ₹ 85$
 \therefore Cost of 16 metres of cloth = $₹ 85 \times 16 = ₹ 1360$
4. \therefore Paid to the worker for 5 days = ₹ 560
 \therefore paid to the worker for 1 day = $\frac{560}{5} = ₹ 112$
 \therefore Paid to the worker for 28 days = $₹ 112 \times 28 = ₹ 3136$
5. For 400 students, the monthly consumption of cereals of a hostel = 5200 kg
 for 1 student, the month consumption of cereals of a hostel = $\frac{5200}{400}$
 $= 13$ kg
 For 260 students the monthly consumption of cereals of a hostel = $13 \times 260 = 3380$ kg
6. Cost of 5 kg of rice = ₹ 130
 Cost of 1 kg of rice = $\frac{₹ 130}{5}$
 Cost of 24 kg of rice = $\frac{₹ 130}{5} \times 24 = ₹ 624$
7. Cost of 15 envelopes = ₹ 60
 Cost of 1 envelope = $₹ \frac{60}{15} = ₹ 4$
 Number of envelopes that can be bought for ₹ 32 = $₹ \frac{32}{4} = 8$
8. Train covers a distance = 85 km
 Time taken by the train = $1\frac{1}{2}$ hours = $\frac{3}{2}$ hours
 Speed of a train = $\frac{\text{Distance}}{\text{Time}} = \frac{85}{3/2} = \frac{170}{3}$ km/h
 Time taken by the train to cover a distance of 340 km
 $= \frac{\text{Distance}}{\text{Speed}} = \frac{340}{\frac{170}{3}} = 6$ km/h

9. A machine manufactures in 6 hours = 24 parts
 The Machine will manufacture in 1 hour = $\frac{24}{6}$ parts = 4 parts
 The machine will manufacture in 24 hours = $4 \times 24 = 96$ parts
10. Number of the folding chairs in 18 kg = 45
 Number of the folding chair in 1 kg = $\frac{45}{18} = \frac{5}{2}$
 Number of the folding chair in 4000 kg = $\frac{5}{2} \times 4000 = 10000$
 So, 10000 chairs can be loaded on a truck having a capacity of carrying 4000 kg load.
11. 280 quintals of wheat yield in = 6 hectares
 1 quintal of wheat yield in = $\frac{6}{280}$ hectares
 225 quintals of wheat yield in = $\frac{6 \times 225}{280} = \frac{135}{28}$ hectares
12. The rent of a room for 4 months = ₹ 4800
 Rent of a room for 1 month = ₹ $\frac{4800}{4} = ₹ 1200$
 Rent of a room for 1 year or 12 months = ₹ $1200 \times 12 = ₹ 14400$
13. An Aeroplane flies in 5 hours = 4000 km
 Aeroplane flies in 1 hour = $\frac{4000}{5} = 800$ km
 Aeroplane will fly in 3 hours = $800 \times 3 = 2400$ km
14. A truck needs diesel to cover 594 km distance = 108 litre
 A truck will need diesel to cover 1 km distance = $\frac{108}{594}$ litre
 Truck will need diesel to cover 160 km distance = $\frac{108}{594} \times 1650$
 = 300 litres
15. Pumping set needs the power for raising 1500 litre of water = 1.5 km
 Pumping set will need the power for raising 4500 litre of water
 = $\frac{1.5}{1500} \times 4500 = 4.5$ km.
16. ₹ 19210 is the price of = 17 chairs
 ₹ 1 is the price of = $\frac{17}{19210}$ chairs
 ₹ 113000 is the price of = $\frac{17 \times 113000}{19210} = 100$ chairs.

17. Cost of 2 dozens oranges = ₹ 60
 or Cost of 24 oranges = ₹ 60
 Cost of 1 orange = ₹ $\frac{60}{24}$
 Cost of 120 orange = ₹ $\frac{60}{24} \times 120 = ₹ 300$
18. The weight of 72 books = 9 kg
 Weight of 1 book = $\frac{9}{72} = \frac{1}{8}$ kg
- (i) The weight of 80 books = $\frac{1}{8} \times 80 = 10$ kg
- (ii) Weight of 1 book = $\frac{1}{8}$ kg
 Weight of 8 books = $\frac{1}{8} \times 8 = 1$ kg
 Number of books in 6 kg = $6 \times 8 = 48$ books
19. Speed of a car = $\frac{165}{3} = 55$ km/h
- (i) Time car to travel 440 km = $\frac{\text{Distance}}{\text{Speed}} = \frac{440}{55} = 8$ hours
- (ii) A car will travel in 7 hours = $55 \times 7 = 385$ km

Apply Your Mind!

1. (c) Let the income be ₹ x
 Ratio of the income to having = $x : 2800$
 $15 : :: x : 2800$
 $15 \times 2800 = 4 \times x$
 $x = \frac{15 \times 2800}{4}$
 Expenditure = ₹ 10500 – ₹ 2800 = ₹ **7700**
2. (b) Number of Consonants = 7
 Number of vowels = 4
 The ratio of the number of Consonants to the number of vowel
 = 7 : 4
4. (a) $45 : x :: 25 : 35$
 $45 \times 35 = x \times 25$
 $x = \frac{5 \times 35}{25}$
 $x = \mathbf{63}$
 Thus, value of x is 63.

<p>5. (a) Men</p> <p style="margin-left: 20px;">↑550 700</p> <p style="margin-left: 20px;">$700 : 550 :: 28 : x$</p> <p style="margin-left: 20px;">$700 \times x = 28 \times 550$</p> <p style="margin-left: 40px;">$x = \frac{28 \times 550}{700}$</p> <p style="margin-left: 40px;">$x = \frac{28 \times 55}{70} \Rightarrow x = 22$</p>	<p style="text-align: right;">No. of days</p> <p style="text-align: right;">28 x ↓</p>
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Thus, number of days will it last long for 700 men for 22 days.

<p>6. (a) No. of days</p> <p style="margin-left: 20px;">↑26 20</p> <p style="margin-left: 20px;">$20 : 26 :: 40 : x$</p> <p style="margin-left: 20px;">$20 \times x = 26 \times 40$</p> <p style="margin-left: 40px;">$x = \frac{26 \times 40}{20} \Rightarrow x = 52$</p>	<p style="text-align: right;">Men</p> <p style="text-align: right;">40 x ↓</p>
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Thus, the number of men will be required to finish in 20 days is 52.

<p>7. (b) Workers</p> <p style="margin-left: 20px;">↑24 8</p> <p style="margin-left: 20px;">$8 : 24 :: 15 : x$</p> <p style="margin-left: 20px;">$8 \times x = 24 \times 15$</p> <p style="margin-left: 40px;">$x = \frac{24 \times 15}{8} = 45$</p>	<p style="text-align: right;">No. of days</p> <p style="text-align: right;">15 x ↓</p>
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Thus, 8 workers will build the wall in 5 days.

8. (b) $b^2 = a$ □

8. Basic Geometrical Ideas

Do it Yourself. □

9. Line Segments : Measurement and Construction

Do it yourself. □

10.

Angles

- Rays with initial point O are OP, OT, OR, OQ, OS
 Rays with initial point P are PO, PT, PR, PQ, PS
 Rays with initial point Q are QS, QO, QP, QT, QR
 Rays with initial point T are TP, TO, TQ, TS, TR .
 - No.
 - Yes.
- There are 8 rays represented in given figure.
 Ray are : $\vec{OG}, \vec{OF}, \vec{OE}, \vec{OD}, \vec{OC}, \vec{OB}, \vec{OA}, \vec{OH}$
- PQ = initial point is P
 - CP = initial point is C
 - YZ = initial point is Y .



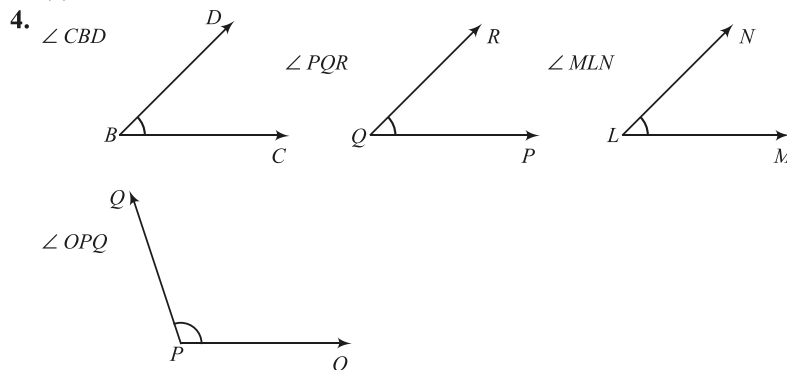
- A Line** : A line is straight and extends infinitely in both directions having no end points.

Line segment : A line segment is a portion of a line having two end points.

Rays : A ray is the parts of lines that extend infinitely in only one direction and have only one end point.

Learning Target 10.2

- Vertex = Y , Arms = YX and YZ
 - Vertex = M , Arms = ML and MN
 - Vertex = P , Arms = PQ and PR
 - Vertex = B , Arms = BA and BC
- 6, $\angle AOB, \angle AOC, \angle AOD, \angle BOC, \angle BOD, \angle COD$
- Angles from environment
 - Hands of clock,
 - An edge of a table
 - Scissors

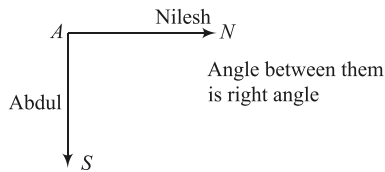


5. (i) $\angle 1 = \angle DAE$ (ii) $\angle 2 = \angle BAC$
 (iii) $\angle 3 = \angle ACD$ (iv) $\angle 4 = \angle ADC$
 (iv) $\angle 5 = \angle AFE$
6. (i) No. (ii) Yes
 (iii) Yes (iv) Yes
 (v) No.
7. $\angle ABD, \angle ADB, \angle BAD, \angle BDC, \angle BCD, \angle CBD, \angle ADC, \angle ABC$
 Two ($\angle A$ and $\angle C$)
8. (i) In the interior of $\angle PQR = A, F, D$
 (ii) In the exterior of $\angle PQR = B, C$
 (iii) On $\angle PQR = G, E, P, Q, R$

Learning Target 10.3

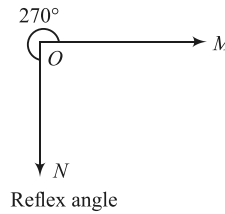
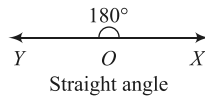
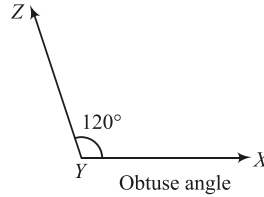
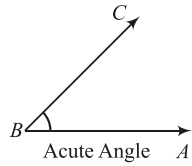
1. (i) $\angle BPY = 45^\circ$
2. (i) Do it yourself.
3. (i) Obtuse angle (ii) Right angle
 (ii) Straight angle (iv) Reflex angle
 (v) Acute angle (vi) Acute angle
4. (i) South-west (ii) North-East

5.



6. (i) East and west = straight angle
 (ii) East and North = right angle
 (iii) North-East and South-west = straight angle
7. (i) $50^\circ < 90^\circ =$ Acute angle
 (ii) $110^\circ > 90^\circ =$ Obtuse angle
 (iii) $75^\circ < 90^\circ =$ Acute angle
 (iv) 180° Straight angle
 (v) $210 > 180^\circ =$ Reflex angle
 (vi) $360^\circ =$ Complete angle
 (vii) $0^\circ =$ Zero angle
 (viii) $90^\circ =$ Right angle

8.



Learning Target 10.4

1. (i) **Linear pair** : $\angle 1$ and $\angle 2$, $\angle 1$ and $\angle 4$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 5$ and $\angle 6$, $\angle 5$ and $\angle 8$, $\angle 6$ and $\angle 7$, $\angle 7$ and $\angle 8$
 (ii) Pair of vertically opposite angle
 $\angle 1 = \angle 3$, $\angle 2 = \angle 4$, $\angle 5 = \angle 7$, $\angle 6 = \angle 8$
2. (i) Yes (ii) No (iii) Yes
 (iv) Yes (v) Yes
3. (i) Complement of $55^\circ = 90^\circ - 55^\circ = 35^\circ$
 (ii) Complement of $73^\circ = 90^\circ - 73^\circ = 17^\circ$
 (iii) Complement of $45^\circ = 90^\circ - 45^\circ = 45^\circ$
 (iv) Complement of $25^\circ = 90^\circ - 25^\circ = 65^\circ$
 (v) Complement of $50^\circ = 90^\circ - 50^\circ = 40^\circ$
4. No, because they do not have a common vertex.
5. (i) $70^\circ, 20^\circ$
 $70^\circ + 20^\circ = 90$
 So, the pair of angle are complementary
 (ii) $160^\circ, 20^\circ$
 $160^\circ + 20^\circ = 180^\circ$
 So, the pair of angle are supplementary
 (iii) $63^\circ, 27^\circ$
 $63^\circ + 27^\circ = 90^\circ$
 So, the pair of angle are complementary
 (iv) $50^\circ, 40^\circ$
 $50^\circ + 40^\circ = 90^\circ$
 So, the pair of angle are complementary

(v) $110^\circ, 70^\circ$

$$110^\circ + 70^\circ = 180^\circ$$

So, the pair of angle are supplementary

(vi) $90^\circ, 90^\circ$

$$90^\circ + 90^\circ = 180^\circ$$

So, the pair of angle are supplementary

(vii) $45^\circ, 45^\circ$

$$45^\circ + 45^\circ = 90^\circ$$

So, the pair of angle are complementary

(viii) $65^\circ, 25^\circ$

$$65^\circ + 25^\circ = 90^\circ$$

So, the pair of angle are complementary

6. (i) Supplement of $70^\circ = 180^\circ - 70^\circ = 110^\circ$

(ii) Supplement of $65^\circ = 180^\circ - 65^\circ = 115^\circ$

(iii) Supplement of $45^\circ = 180^\circ - 45^\circ = 135^\circ$

(iv) Supplement of $90^\circ = 180^\circ - 90^\circ = 90^\circ$

(v) Supplement of $135^\circ = 180^\circ - 135^\circ = 45^\circ$

7. Obtuse angle

8. Let the supplementary angle is x° .

Then required angle = x°

$$x^\circ + x^\circ = 180^\circ \Rightarrow 2x^\circ = 180^\circ$$

$$x^\circ = \frac{180^\circ}{2} \Rightarrow x^\circ = 90^\circ$$

9. Let the complementary angle is x°

Then required angle = x°

$$x^\circ + x^\circ = 90^\circ \Rightarrow x^\circ = \frac{90^\circ}{2}$$

$$x^\circ = 45^\circ$$

10. The measure of one supplementary angle is decreased, then other supplementary angle will increase. Because the sum of the two angles remains the same.

11. (i) True (ii) True (iii) True (iv) False

(v) True (vi) True

12. (i) Obtuse + Obtuse $> 180^\circ$

So, pair of angle are not supplementary.

(ii) Acute + AC $< 180^\circ$

So, the pair of angle are not supplementary.

(iii) Right + Right = 180°

So, the pair of angle are supplementary.

13. An angle is greater than 45° , then its complementary angle is less than 45°

14. (i) y° and 35° are linear pair of angle.

$$y^\circ + 35 = 180^\circ \Rightarrow y = 145^\circ$$

z° and 35° are vertically opposite angle.

$$\boxed{z^\circ = 35^\circ}$$

$$x^\circ + 80^\circ + z^\circ = 180^\circ \text{ [linear pair property]}$$

$$x = 180^\circ - 35^\circ - 80^\circ$$

$$\boxed{x = 65^\circ}$$

(ii) $y = 65^\circ$ (Vertically opposite)

x and 65° are linear pair of angle

$$x + 65^\circ = 180^\circ$$

$$x = 180^\circ - 65$$

$$\boxed{x = 115^\circ}$$

$x = z$ (vertically opposite angle)

$$\boxed{z = 115^\circ}$$

Apply Your Mind!

- (c) A complete angle
- (c) A straight angle
- (c) 180°
- (b) Let the supplementary angle is x

$$\text{Then required angle} = \frac{x}{3}$$

$$x + \frac{x}{3} = 180^\circ \Rightarrow x = \frac{180 \times 3}{4}$$

$$x^\circ = 135^\circ$$

- (c) More than 180° but less than 360° .

□

11. Pairs of Lines and Transversals

Learning Target 11.1

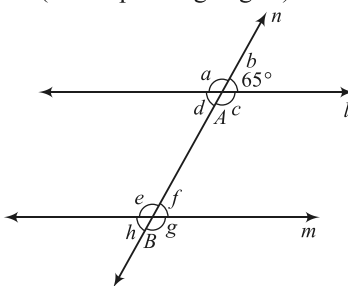
- Only in fig (i) and (iii), (iv) l is a transversal as it intersects two or more given lines in a plane at different points.
- (a) p is transversal line as it intersects lines l and m at two different points.
(b) EF is a transversal line as it intersects lines AB and CD at two different points.

Learning Target 11.2

1. No, because on extending they will intersect each other.
2. (i) $AB \parallel ED, AF \parallel CD, EF \parallel CB$
 (ii) $AB \parallel RP, PQ \parallel AC, QR \parallel BC$
 (iii) $PR \parallel BC, PQ \parallel AC, RP \parallel QC, PQ \parallel RC, PR \parallel BQ, PQ \parallel AR$
 (iv) $AB \parallel CD, BC \parallel AD, AE \parallel FC, AF \parallel EC, BC \parallel AF, EC \parallel AD,$
 $BE \parallel FD, BE \parallel AF, BE \parallel AD, FD \parallel BC, FD \parallel EC.$

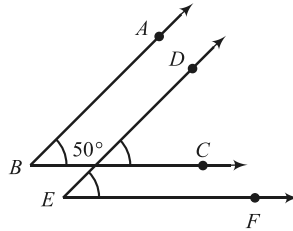
Learning Target 11.3

1. $\angle PQC = \angle RPA$ (Corresponding angles)
 $\angle RPA = 35^\circ$
 $\angle RPA + \angle RPB = 180^\circ$ [Linear pair of angles]
 $35^\circ + \angle RPB = 180^\circ$
 $\angle RPB = 180^\circ - 35^\circ \Rightarrow \angle RPB = 145^\circ$
2. $\angle b = \angle f$ (Corresponding angles)
 $\therefore \angle f = 65^\circ$
 $\angle f = \angle d$ (Alternate angles)
 $\therefore \angle d = 65^\circ$
 $\angle d = \angle h$ (Corresponding angles)
 $\therefore \angle h = 65^\circ$
 $\angle e + \angle d = 180^\circ$ (Interior supplementary angles)
 $\angle e + 65^\circ = 180^\circ (\because \angle d = 65^\circ)$
 $\therefore \angle e = 180^\circ - 65^\circ = 115^\circ$
 $\angle e = \angle a$ (Corresponding angles)

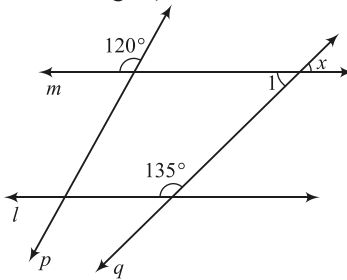


- $\therefore \angle a = 115^\circ$
 $\angle e = \angle c$ (Alternate angles)
 - $\therefore \angle c = 115^\circ$
 $\angle g = \angle c$ (Corresponding angles)
 - $\therefore \angle g = 115^\circ$
- Thus, $\angle c = \angle g = \angle a = \angle e = 115^\circ$
 and $\angle b = \angle f = \angle d = \angle h = 65^\circ$

3.



4. (i) In figure, we have
 $\angle 1 + 135^\circ = 180^\circ$ (Interior supplementary angles)
 $\angle 1 = 180^\circ - 135^\circ = 45^\circ$
 $\angle 1 = \angle x$ (Vertically opposite angles)
 $\therefore \angle x = 45^\circ$
- (ii) $\angle x = 60^\circ$ (Alternate angles)



Apply Your Mind!

- | | | |
|--------|--------|--------|
| 1. (a) | 2. (a) | 3. (b) |
| 4. (c) | 5. (a) | |



12.

Polygons

Learning Target 12.1

- Polygon: a closed figure obtained by joining three or more straight line segments
- Closed Curve: a curve beginning and ending at the same place. Open Curve: a curve not ending at the point it began
- (i) open (ii) open (iii) closed (iv) closed
- Regular polygons have sides of equal length, whereas in irregular polygons all the sides are not equal.

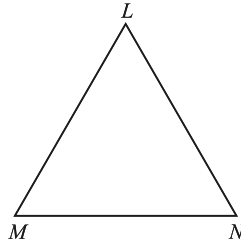
5. (i) equilateral triangle (ii) square (iii) regular pentagon
 (iv) regular hexagon (v) regular heptagon
 (vi) regular octagon (vii) regular nonagon
 (viii) regular decagon
6. Do it yourself.



13. Triangles

Learning Target 13.1

1. (i) three (ii) three (iii) three (iv) six
2. Triangle, $\triangle LMN$



3. (a) NL, (b) LN (c) M (d) LM
4. No,
5. $\triangle AOD, \triangle AOB, \triangle DOC, \triangle BOC, \triangle ADC, \triangle ABC, \triangle BCD$
 (i) $\triangle BOC, \triangle ABC, \triangle BDC$
 (ii) $\triangle AOB, \triangle COD, \triangle ABC, \triangle BCD, \triangle BOC$
 (iii) $\triangle BOC, \triangle COD, \triangle BCD,$
 (iv) None
 (v) None
6. 12,
 $\triangle ABC, \triangle ADE, \triangle DEF, \triangle EFC, \triangle DFB, \triangle FBC, \triangle DEB, \triangle DEC, \triangle AEB,$
 $\triangle ADC, \triangle BCD, \triangle BEC$
7. (i) $\triangle ABC, \triangle ADE, \triangle AEB, \triangle ADC$
 (ii) $\triangle ABC, \triangle DFB, \triangle FBC, \triangle DEB, \triangle AEB, \triangle BCD, \triangle BEC$
 (iii) $\triangle ABC, \triangle EFC, \triangle FBC, \triangle DEC, \triangle ADC, \triangle BCD, \triangle BEC$
 (iv) $\triangle ADE, \triangle DEF, \triangle DFB, \triangle DEB, \triangle DEC, \triangle ADC, \triangle BCD$
 (v) $\triangle ADE, \triangle DEF, \triangle EFC, \triangle DEB, \triangle DEC, \triangle AEB, \triangle BEC$
 (vi) $\triangle DEF, \triangle EFC, \triangle DFB, \triangle FBC.$
8. $\triangle ADE, \triangle DEF, \triangle ADC, \triangle DEC, \triangle FEC$
 Do on at least one of the triangle
 $\triangle ABC, \triangle ADE, \triangle ABE, \triangle DEF, \triangle DEB, \triangle CED, \triangle ADC, \triangle DBF, \triangle DBC.$

9. The points are in the triangular region PQR .

P, Q, R, A, D, G and C .

The points are lie on the ΔPQR P, Q, R, A, D and G .

Learning Target 13.2

1. (i) Acute-angled triangle [All three angles are acute]
(ii) Obtuse-angled triangle [One obtuse angle]
(iii) Right-angled triangle [One-right angle]
(iv) Obtuse-angled triangle [One obtuse angle]
(v) Right-angled triangle [One right angle]
(vi) Acute-angled triangle [All three angles are acute]
2. (i) Isosceles triangle [Two sides are equal]
(ii) Scalene triangle [All sides are not equal]
(iii) Scalene triangle [All sides are not equal]
(iv) Scalene triangle [All sides are not equal]
(v) Equilateral triangle [All sides are equal]
3. (i) Right-angled Triangle [One-right angle]
(ii) Obtuse-angled triangle [One obtuse angle]
(iii) Acute-angled triangle [All three angles are acute]
(iv) Obtuse-angled triangle [One obtuse angle]
(v) Right-angled triangle [One-right angle]
(vi) Acute-angled triangle [All three angles are acute]
4. (i) 2 cm, 3 cm, 2 cm
Two sides are equal.
So, the triangle is an isosceles triangle.
(ii) 2 cm, 2 cm, 2 cm
All sides are equal.
So, the triangle is an equilateral triangle.
(iii) 3 cm, 6 cm, 4 cm
All sides are not equal.
So, the triangle is a scalene triangle.
(iv) 7 cm, 12 cm, 3 cm
All sides are not equal.
So, the triangle is a scalene triangle.
(v) 5 cm, 5 cm, 5 cm
All sides are equal.
So, the triangle is an equilateral triangle.
(vi) 4 cm, 4 cm, 5 cm
Two sides are equal.
So, the triangle is an isosceles triangle.

Learning Target 13.3

1. (i) 4, 5, 6
Since $4 + 5 > 6$, $6 + 4 > 5$, $6 + 5 > 4$
Therefore 4, 5, and 6 could be possible lengths of the sides of a triangles.
- (ii) 7, 11, 13
Since $7 + 11 > 13$, $7 + 13 > 11$, $11 + 13 > 7$, therefore 7, 11 and 13
Could be possible lengths of the sides of a triangle.
- (iii) 11, 5, 14
Since $11 + 5 > 14$, $11 + 14 > 5$, $5 + 14 > 11$, therefore 11, 5 and 14
Could be possible lengths of the sides of triangle.
- (iv) 19, 4, 25
Since $19 + 4 < 25$, therefore property is not satisfied
Hence, 19, 4 and 25 can not be sides of a triangle.
- (v) 5, 17, 22
Since $5 + 17 = 22$ therefore property is not satisfied.
Hence, 5, 17 and 22 can not be sides of a triangle.
- (vi) 23, 25, 17
Since $23 + 25 > 17$, $25 + 17 > 23$, $17 + 23 > 25$
Therefore, 23, 25 and 17 could be possible length of the sides of a triangle.
2. (i) $50^\circ, 95^\circ, 43^\circ$
Here $50^\circ + 95^\circ + 43^\circ = 188^\circ$
 $188^\circ \neq 180^\circ$
So, triangle cannot be formed.
- (ii) $43^\circ, 37^\circ, 100^\circ$
Here $43^\circ + 37^\circ + 100^\circ = 180^\circ$
So, triangle can be formed.
- (iii) $71^\circ, 35^\circ, 74^\circ$
 $71^\circ + 35^\circ + 74^\circ = 180^\circ$
 $180^\circ = 180^\circ$
So, triangle can be formed.
- (iv) $45^\circ, 45^\circ, 90^\circ$
Here, $45^\circ + 45^\circ + 90^\circ = 180^\circ$
So, triangle can be formed
- (vi) $45^\circ, 61^\circ, 73^\circ$
Here, $45^\circ + 61^\circ + 73^\circ = 179^\circ$
 $179^\circ \neq 180^\circ$
So, triangle can not be formed.

3. We know the sum of three angles of a triangle = 180°

(i) $30^\circ + 60^\circ + x = 180^\circ$

$$90^\circ + x = 180^\circ; x = 180^\circ - 90^\circ = \mathbf{90^\circ}$$

(ii) $45^\circ + 45^\circ + x = 180^\circ$

$$x = 180^\circ - 90^\circ = 90^\circ$$

(iii) $20^\circ + 70^\circ + x = 180^\circ$

$$x = 180^\circ - 90^\circ = 90^\circ$$

(iv) $35^\circ + 55^\circ + x = 180^\circ$

$$x = 180^\circ - 90^\circ$$

$$x = 90^\circ$$

Yes, third angle is equal to the sum of first two angles in each case.

4. $\angle A = \angle B + \angle C$

We know that,

$$\angle A + \angle B + \angle C = 180^\circ$$

$$\angle A + \angle A = 180^\circ$$

$$2\angle A = 180^\circ$$

$$\Rightarrow \angle A = \mathbf{90^\circ}$$

5. $\angle A = \angle B = \angle C$

We know that the sum of three angles of a triangle = 180°

$$\angle A + \angle B + \angle C = 180^\circ$$

$$\angle A + \angle A + \angle A = 180^\circ$$

$$3\angle A = 180^\circ$$

$$\angle A = \frac{180^\circ}{3}$$

$$\angle A = \mathbf{60^\circ}$$

Each angle of triangle is 60° .

6. $160^\circ + x + x = 180^\circ$

$$2x = 180^\circ - 160^\circ; 2x = 20^\circ; x = \frac{20^\circ}{2}; x = \mathbf{10^\circ}$$

7. $\angle ABO + \angle CBD = \angle ABC$... (1)

$$\angle BDA + \angle BDC = \angle ADC$$
 ... (2)

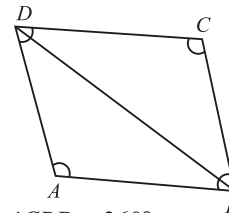
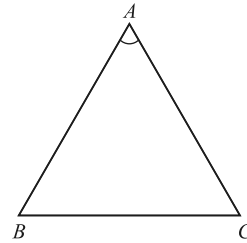
$$\angle DAB + \angle ABD + \angle BDA = 180^\circ$$
 ... (3)

$$\angle BDC + \angle DCB + \angle CBD = 180^\circ$$
 ... (4)

Eq. (3) + eq. (4)

$$\angle DAB + \angle ABD + \angle BDA + \angle BDC + \angle DCB + \angle CBD = 360^\circ$$

$$\angle DAB + \angle ABC + \angle BCD + \angle CDA = 360^\circ \text{ (from eq. 1 and 2)}$$



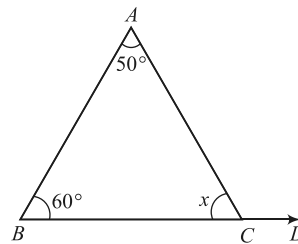
$$\begin{aligned}
8. \quad & \angle BAC + \angle CAD + \angle DAE = \angle EAB && \dots(1) \\
& \angle BCA + \angle ACD = \angle BCD && \dots(2) \\
& \angle CDA + \angle ADE = \angle CDE && \dots(3) \\
& \text{In } \triangle ABC && \\
& \angle ABC + \angle BCA + \angle BAC = 180^\circ && \dots(4) \\
& \text{In } \triangle ACD && \\
& \angle CAD + \angle ACD + \angle CDA = 180^\circ && \dots(5) \\
& \text{In } \triangle ADE && \\
& \angle DAE + \angle ADE + \angle AED = 180^\circ && \dots(6) \\
& \text{Eq (4) + Eq (5) + Eq 6} && \\
& \angle ABC + \angle BCA + \angle BAC + \angle CAD + \angle ACD + \angle CDA + \angle DAE && \\
& + \angle ADE + \angle AED = 540^\circ && \\
& \angle ABC + \angle EAB + \angle BCD + \angle CDE + \angle DEA = 540^\circ &&
\end{aligned}$$

[from eq. (1), 2 and (3)]

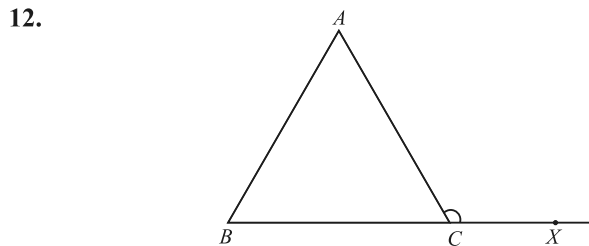
$$\begin{aligned}
9. \quad & \text{(i) } \angle ACX = \angle CAB + \angle ABC \\
& \text{(ii) } \angle BAY = \angle ACB + \angle ABC \\
& \text{(iii) } \angle CBZ = \angle ACB + \angle CAB
\end{aligned}$$

$$\begin{aligned}
10. \quad & \angle A + \angle B + \angle C = 180^\circ \\
& 50^\circ + 60^\circ + x = 180^\circ \\
& 110^\circ + x = 180^\circ \\
\Rightarrow & \quad \quad \quad x = 180^\circ - 110^\circ \\
& \quad \quad \quad x = 70^\circ
\end{aligned}$$

$$\begin{aligned}
\text{Now, } & \angle BCD = 180^\circ \\
& \angle BCA + \angle ACD = 180^\circ \\
& 70^\circ + \angle ACD = 180^\circ \\
& \angle ACD = 180^\circ - 70^\circ = \mathbf{110^\circ}
\end{aligned}$$

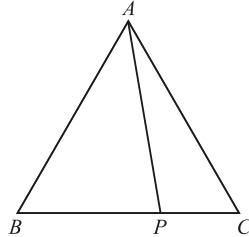


$$\begin{aligned}
11. \quad & \text{(i) Interior adjacent angle } \angle CBY = \angle CBA \\
& \text{(ii) Interior opposite angles corresponding to } \angle CBY \\
& = \angle CAB \text{ and } \angle BCA
\end{aligned}$$



$$\begin{aligned}
13. \quad & \text{(i) } AP < AB + BP \\
& \text{(ii) } AP < AC + PC
\end{aligned}$$

(iii) $AM < \frac{1}{2}(AB + AC + BC)$



14. (i) F (ii) F (iii) F (iv) T
15. (i) No. (ii) Yes (iii) No (iv) No
(v) Yes (vi) Yes (vii) No

Apply Your Mind!

1. (c) 2. (b)
3. (b) $2x + 3x + 4x = 180^\circ \Rightarrow 9x = 180^\circ$
 $x = 20$
Largest angle = $4 \times 20 = 40^\circ$
4. (c) $70 + 70 + x = 180^\circ \Rightarrow x = 40^\circ$
5. (c)
6. $\angle A + \angle B = 90^\circ$ ($\angle A$ and $\angle B$ are complementary)
 $\angle A + \angle B + \angle C = 180$
 $90 + \angle C = 180 \Rightarrow \angle C = 180 - 90^\circ$
 $\angle C = 90^\circ$



14. Constructions

Learning Target 14.1

Do it yourself.

Learning Target 14.2

Do it yourself.

Learning Target 14.3

1. Do it yourself.

Yes, the perpendicular bisector of AB passes through the centre of the circle.

2. Do it yourself.
Yes, the perpendicular bisector of the line segment PQ passes through the centre of the circle.
3. (i) Do it yourself.
(ii) They intersect at the centre.
4. Do it yourself.
5. (i), (ii) Do it yourself.

Learning Target 14.4

Do it yourself.

Learning Target 14.5

1. Do yourself. Yes the lines l and m are parallel to each other.
2. Do it yourself.
3. Do it yourself.
4. Do it yourself.
Yes, AE and EC are equal.

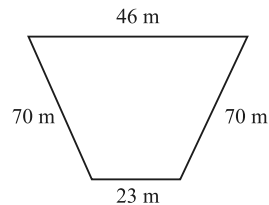


15. Perimeter and Area

Learning Target 15.1

1. (i) Perimeter of triangle = Sum of three sides
 $= (3 + 1.5 + 2) \text{ cm} = \mathbf{6.5 \text{ cm}}$
- (ii) $6 \text{ m} + 8 \text{ m} + 10 \text{ m} = 24 \text{ m}$
- (iii) $24 \text{ cm} + 25 \text{ cm} + 23 \text{ cm} = 72 \text{ cm}$
- (iv) $10 \text{ cm} + 10 \text{ cm} + 10 \text{ cm} = \mathbf{30 \text{ cm}}$

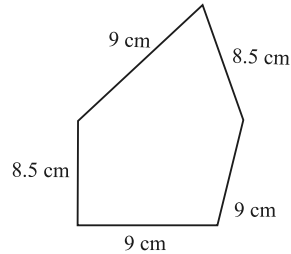
2. (i)



$$= (46 + 23 + 70 + 70) \text{ m} = \mathbf{209 \text{ m}}$$

- (ii) $17 \text{ cm} + 17 \text{ cm} + 17 \text{ cm} + 17 \text{ cm} = 68 \text{ cm}$
- (iii) $5 \text{ cm} + 5 \text{ cm} + 5 \text{ cm} + 5 \text{ cm} = 20 \text{ cm}$

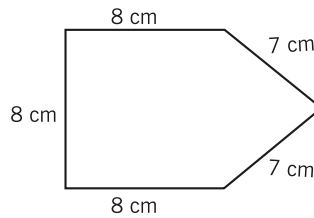
3. (i)



$$= (9 + 9 + 9 + 8.5 + 8.5) \text{ cm} = \mathbf{44 \text{ cm}}$$

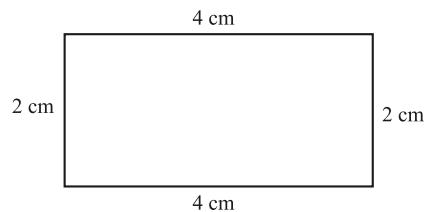
(ii) $6 \text{ cm} + 6 \text{ cm} + 6 \text{ cm} + 6 \text{ cm} + 6 \text{ cm} + 6 \text{ cm} + 6 \text{ cm} + 6 \text{ cm}$
 $+ 6 \text{ cm} + 6 \text{ cm} = 60 \text{ cm}$

(iii)



$$= (8 + 8 + 8 + 7 + 7) \text{ cm} = \mathbf{38 \text{ cm}}$$

4. (i)



Perimeter of rectangle = sum of four side.

$$= (4 + 4 + 2 + 2) \text{ cm} = \mathbf{12 \text{ cm}}$$

(ii) Perimeter of rectangle = $6 + 2 + 6 + 2 = 16 \text{ cm}$

(iii) Perimeter of rectangle = $6 \text{ cm} + 1 \text{ cm} + 6 \text{ cm} + 1 \text{ cm} = 14 \text{ cm}$

5. (i) Perimeter of square = $4 \times \text{side} = 4 \times 2.5 \text{ m} = \mathbf{10.0 \text{ m}}$

(ii) Perimeter of square = $4 \times \text{Side} = 4 \times 4 \text{ m} = 16 \text{ m}$

(iii) Perimeter of square = $4 \times \text{Side} = 4 \times 9 \text{ m} = 36 \text{ m}$

6. (i) Perimeter of rectangle = Sum of four sides

$$= (4 + 3.5 + 4 + 3.5) \text{ cm} = \mathbf{15 \text{ cm}}$$

(ii) Perimeter of rectangle = $21 \text{ m} + 7 \text{ m} + 21 \text{ m} + 7 \text{ m} = 56 \text{ m}$

(iii) Perimeter of rectangle = $15 \text{ m} + 0.2 \text{ m} + 15 \text{ m} + 0.2 \text{ m} = 30.4 \text{ m}$

7. (i) Perimeter of rectangle = $2 \times (l + b) = 2 \times (5 + 4) = 2 \times 9 = \mathbf{18 \text{ cm}}$

(ii) Perimeter of rectangle = $2(l + b) = 2(6 + 2) = 16 \text{ cm}$

(iii) Perimeter of rectangle = $2 \times (l + b) = 2 \times (7 + 1.5) = 2 \times 8.5 = \mathbf{17 \text{ cm}}$

8. (i) Perimeter of square = $4 \times \text{Side}$

$$100 = 4 \times \text{Side} \Rightarrow \frac{100}{4} = \text{side}$$

$$\text{side} = 25 \text{ cm}$$

(ii) Perimeter of square = $4 \times \text{Side} = 4 \times 16 = 64 \text{ cm}$

(iii) Perimeter of square = $4 \times 40 \text{ cm} = 160 \text{ cm}$

(iv) Perimeter of square = $4 \times 22 = 88 \text{ m}$

9. Perimeter of triangle = Sum of three sides.

$$50 = 15 + 20 + x; 50 - 35 = x$$

$$\Rightarrow x = 50 - 35 = 15$$

Third side = **15 cm**

10. (i) Perimeter of rectangle = 360 cm, $l = 100 \text{ cm}$

$$\text{Perimeter of rectangle} = 2(l + b)$$

$$360 = 2(100 + b) \Rightarrow 100 + b = \frac{360}{2}$$

$$b = 180 - 100 = 80 \text{ cm, breadth} = 80 \text{ cm}$$

(ii) $l = 116 \text{ cm}$

$$\text{Perimeter of rectangle} = 2(l + b)$$

$$360 = 2(116 + b)$$

$$b = \frac{360}{2} - 116 = 180 - 116 = 64 \text{ cm}$$

(iii) $l = 140 \text{ cm}$

$$\text{Perimeter of rectangle} = 2(l + b)$$

$$360 = 2(140 + b) \Rightarrow b = 40 \text{ cm}$$

(iv) $l = 102 \text{ cm}$

$$\text{Perimeter of rectangle} = 2(l + b)$$

$$360 = 2(102 + b) \Rightarrow b = 180 - 102 \Rightarrow b = 78 \text{ cm}$$

11. Perimeter of rectangular park = $2 \times (l + b) = 2 \times (300 + 200) = 1000 \text{ m}$

$$\therefore \text{Cost of fencing a park} = ₹ 1000 \times 24 = ₹ \mathbf{24000}$$

12. Distance covered by Sweety = $4 \times 75 \text{ m} = 300 \text{ m}$

$$\text{Distance covered by Bulbul} = 2 \times (60 + 45) \text{ m} = 2 \times 105 \text{ m} = 210 \text{ m}$$

Since **300 m > 210**

\therefore Bulbul covered smaller distance.

13. Perimeter of square park = $4 \times 300 \text{ m} = 1200 \text{ m}$

$$\text{Cost of fencing a square park} = ₹ 20 \times 1200 = ₹ 24000$$

14. Perimeter of square = $4 \times \text{side} = 4 \times 75 = 300 \text{ m}$

$$\text{Distance covered in three times} = 300 \times 3 = 900 \text{ m}$$

$$\text{Perimeter of rectangle} = 2 \times (l + b) = 2 \times (160 + 105)$$

$$= 2 \times 265 = 530 \text{ m}$$

Distance covered in two times = $2 \times 530 = 1060$ m
 Bob covers more distance = $1060 \text{ m} - 900 \text{ m} = \mathbf{160 \text{ m}}$.

15. Perimeter of rectangles = Perimeter of square = 36 cm.

\therefore Every square is also a rectangle.

and Perimeter of square = $4 \times \text{side}$

$$36 = 4 \times \text{side}$$

$$\text{Side} = \frac{36}{4} = \mathbf{9 \text{ cm}}$$

Thus, nine rectangles can be drawn with 36 cm as the perimeter.

Learning Target 15.2

1. (i) Area of rectangle = length \times breadth = $4 \text{ cm} \times 1 \text{ cm} = \mathbf{4 \text{ cm}^2}$
 (ii) Area of rectangle = $4 \text{ cm} \times 2 \text{ cm} = 8 \text{ cm}^2$
 (iii) Area of rectangle = $8 \text{ cm} \times 5 \text{ cm} = 40 \text{ cm}^2$
2. (i) Area of rectangle = length \times breadth = $24 \text{ cm} \times 10 \text{ cm} = \mathbf{240 \text{ cm}^2}$
 (ii) Area of rectangle = $40 \text{ cm} \times 20 \text{ cm} = 800 \text{ cm}^2$
 (iii) Area of rectangle = $20.4 \text{ cm} \times 10 \text{ cm} = 204 \text{ cm}^2$
 (iv) Area of rectangle = $41.5 \text{ cm} \times 30 \text{ cm} = 1245 \text{ cm}^2$
3. (i) Area of rectangle = length \times breadth = $11 \text{ cm} \times 7 \text{ cm} = \mathbf{77 \text{ cm}^2}$
 (ii) Area of rectangle = length \times breadth = $100 \text{ cm} \times 75 \text{ cm} = 7500 \text{ cm}^2$
4. (i) Area of square = $(\text{side})^2 = (11)^2 = \mathbf{121 \text{ cm}^2}$
 (ii) Area of square = $(\text{side})^2 = \left(\frac{1}{2} \text{ m}\right)^2 = \frac{1}{4} \text{ m}^2$
5. (i) Area of rectangle = $l \times b = 24 \times 16 = 384 \text{ cm}^2$
 (ii) Area of square = $(\text{Side})^2 = (21)^2 = 441 \text{ cm}^2$
 Square has larger area = $441 - 384 = \mathbf{57 \text{ cm}^2}$
6. (i) Area of rectangle = length \times breadth = $2l \times b = \mathbf{2lb}$ (doubled)
 (ii) $l \times b = lb = l \times 2b = \mathbf{2lb}$ (doubled)
 (iii) $l \times b = 2l \times 2b = \mathbf{4lb}$ (four times)
7. (i) Area of square = $(\text{side})^2 = (2x)^2 = \mathbf{4x^2}$
 Area will get four times than original area.
 (ii) Area of square = $(3x)^2 = 9x^2$
 Area will get nine times than original area.

$$(iii) \text{ Area of square} = \left(\frac{1}{2}x\right)^2 = \frac{1}{4}x^2$$

Area will have become one-fourth of the original area.

$$8. \text{ Area of bathroom} = 3 \times 3 = 9 \text{ m}^2$$

$$\text{Area of one tile} = \frac{25 \times 25}{100 \times 100} \text{ m}^2$$

$$\text{Number of tiles} = \frac{3 \times 3 \times 100 \times 100}{25 \times 25} = \mathbf{144}$$

$$9. 1 \text{ cm} = 10 \text{ mm}, 1 \text{ cm}^2 = 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ mm} \times 10 \text{ mm} = \mathbf{100 \text{ mm}^2}$$

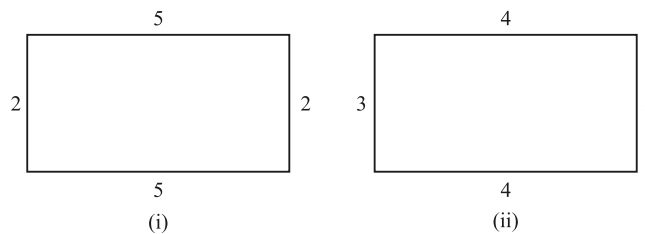
$$10. 1 \text{ m} = 100 \text{ cm}, 1 \text{ m}^2 = 1 \text{ m} \times 1 \text{ m} = 100 \text{ cm} \times 100 \text{ cm} = \mathbf{10000 \text{ cm}^2}$$

$$11. \text{ Area of square} = \text{Area of rectangle} = 16^2 = 64 \times \text{breadth}$$

$$\therefore \text{breadth} = \frac{16 \times 16}{64} = \frac{16}{4} = \mathbf{4 \text{ cm}}$$

Note : All units are in centimeters.

12.



$$\text{Area of rectangle (i)} = 5 \times 2 = 10 \text{ cm}^2$$

$$\text{Area of rectangle (ii)} = 4 \times 3 = 12 \text{ cm}^2$$

So, we have reached the conclusion that it is possible to draw 2 rectangle of same perimeter, but their areas will not be the same.

However, in case of squares. It is not possible to draw any 2 squares having same perimeter.

13. Let $ABCD$ be a rectangle with length l and breadth b and $PQRS$ be a square of side l (equal to the length of given rectangle).

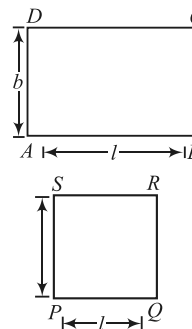
Now, square $PQRS$ will have larger area than that of rectangle $ABCD$, because for $ABCD$ to be a rectangle, $b < l$ (Its breadth must be less than its length). So, by comparing areas of both we can clearly see that area of square is larger.

$$\text{Area of rectangle} = l \times b, b < l$$

$$\text{Area of square} = l \times l$$

$$l \times l > l \times b$$

$$\text{Area of squares } PQRS > \text{Area of rectangle } ABCD.$$



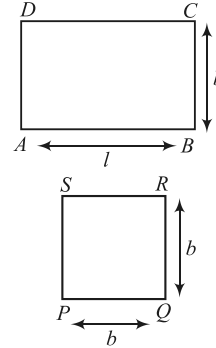
14. Let $ABCD$ be a rectangle with length l and breadth b and $PQRS$ be a square of side b (equal to the breadth of given rectangle). Now, square $PQRS$ will have smaller area than that of rectangle $ABCD$, because for $ABCD$ to be a rectangle, $b < l$.

So, by comparing areas of both we can clearly see that area of square is smaller

$$\text{Area of rectangle } ABCD = l \times b$$

$$\text{Area of square } PQRS = b^2$$

$$l \times b > b^2$$



Apply Your Mind!

1. (b) Perimeter of square = 28 cm

$$4 \times \text{side} = 28 \text{ cm}$$

$$\text{side} = \frac{28}{4} = 7 \text{ cm.}$$

$$\begin{aligned} \text{Then, the area of square} &= (\text{side})^2 \\ &= (7 \text{ cm})^2 = 49 \text{ cm}^2 \end{aligned}$$

2. (a) The perimeter of given figure

$$= [8 \text{ cm} + 8 \text{ cm} + 8 \text{ cm} + 8 \text{ cm} + 8 \text{ cm}] = \mathbf{40 \text{ cm}}$$

3. (c) Let the sides of a rectangle in ratio = $5x : 4x$

$$\text{Perimeter of a rectangle} = 72 \text{ cm}$$

$$2(l + b) = 72 \text{ cm}$$

$$2[5x + 4x] = 72 \text{ cm}$$

$$9x = \frac{72}{2} \Rightarrow 9x = 36 \Rightarrow x = 4$$

$$\text{Length of the rectangle} = 5x = 5 \times 4 = \mathbf{20 \text{ cm}}$$

4. (c) According to question.

Clearly, the perimeter of a square field.

$$= ₹ \frac{2000}{25} = 80$$

$$4 \times \text{side} = 80$$

$$\text{side} = \frac{80}{4} = 20$$

$$\text{side} = \mathbf{20 \text{ m}}$$

Thus, the length of each side of the field is 20 cm.



Half Yearly Model Test Paper

1. (i) 98273496, 98273498 (ii) 72373, 72375
 (iii) 7354526, 7354528 (iv) 173899, 173901
 (v) 99,999; 100001

2. (ii) 123015 (iii) 151230

3. Smallest 5-digit number = 10000
 $10000 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$

4. (i)
$$\begin{array}{r|l} 2 & 162 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline & 3 \end{array} \quad \begin{array}{r|l} 2 & 234 \\ \hline 3 & 117 \\ \hline 3 & 39 \\ \hline & 13 \end{array}$$

(ii)
$$\begin{array}{r|l} 17 & 17 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 47 & 47 \\ \hline & 1 \end{array}$$

HCF = $2 \times 3 \times 3 = 18$

HCF = 1

- (iii) 13, 39, 273

$$\begin{array}{r|l} 13 & 13 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 3 & 39 \\ \hline 13 & 13 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 3 & 273 \\ \hline 79 & 13 \\ \hline & 1 \end{array}$$

HCF = 13

5. Length = 2 m 67 cm = 267 cm
 Breadth = 4 m 45 cm = 445 cm
 Height = 7 m 12 cm = 712 cm
 267, 445, 712

$$\begin{array}{r} 267) 445 \ (1) \\ \underline{267} \\ 178 \\ 178) 178 \ (2) \\ \underline{178} \\ 0 \end{array} \quad \begin{array}{r} 89) 712 \ (8) \\ \underline{712} \\ 0 \end{array}$$

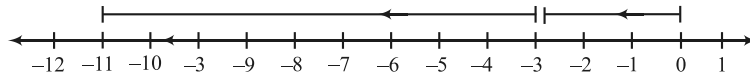
HCF = **89**

Thus the longest tape which can measure the three dimensions of room exactly is **89 cm**.

$$\begin{array}{r|l}
 2 & 220, 300 \\
 \hline
 2 & 110, 150 \\
 \hline
 3 & 55, 75 \\
 \hline
 5 & 55, 25 \\
 \hline
 5 & 11, 5 \\
 \hline
 11 & 11, 1 \\
 \hline
 & 1, 1
 \end{array}$$

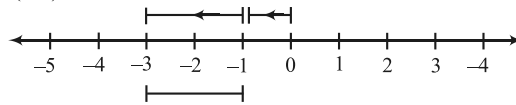
$$\text{LCM} = 2 \times 2 \times 3 \times 5 \times 5 \times 11 = 3300 \text{ m}$$

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



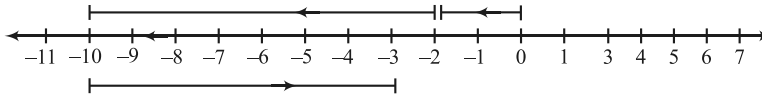
Addition of '-' integers $(-3) + (-8) = -11$

(ii) $-1 + (-2) + 2$



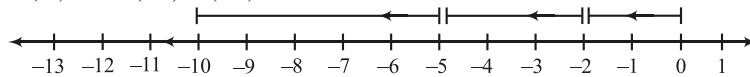
Addition of '-' and '+' integer $-1 + (-2) + 2 = -1$

(iii) $-2 + 7 + (-8)$



Addition of '-' and '+' integer $-2 + 7 + (-8) = -3$

(iv) $-2 + (-3) + (-5)$



Addition of '-' integer $(-2) + (-3) + (-5) = -10$

8. Temperature of Delhi = $13^\circ\text{C} = 13^\circ\text{C} - 6^\circ\text{C} = 7^\circ\text{C}$

Temperature of Chennai = $18^\circ\text{C} - 10^\circ\text{C} = 8^\circ\text{C}$

Chennai fall is greater, 8°C

9. (i) F (ii) T (iii) F (iv) T (v) F.

10. (i) (iii) (iv)

11. (i) $\frac{7}{10} + \frac{11}{20} = \frac{7 \times 2}{10 \times 2} + \frac{11}{20}$ [LCM of 10, 20 = 20]

$$= \frac{14 + 11}{20} = \frac{25}{20} = \frac{5}{4}$$

$$(ii) \frac{2}{7} + \frac{3}{6} = \frac{2}{7} + \frac{1}{2} = \frac{2}{7} + \frac{1}{2} \text{ [LCM of 7 and 2 = 14]}$$

$$= \frac{4+7}{14} = \frac{11}{14}$$

$$(iii) \frac{14}{15} - \frac{3}{10} = \frac{14 \times 2}{15 \times 2} - \frac{3 \times 3}{10 \times 3} \text{ [LCM of 15 and 10 = 30]}$$

$$= \frac{28-9}{30} = \frac{19}{30}$$

$$(iv) \frac{19}{30} - \frac{9}{20} = \frac{19 \times 2}{30 \times 2} - \frac{9 \times 3}{20 \times 3} \text{ [LCM of 30 and 20 = 60]}$$

$$= \frac{38-27}{60} = \frac{11}{60}$$

12. $42:12 \times 100 \Rightarrow 42:120 \Rightarrow 7:20$

13. Let Rakesh's share = $7x$, Lokesh's share = $2x$

and Mukesh's share = $3x$

According to question, $7x + 3x + 2x = 3600 \Rightarrow 12x = 3600$

$$x = \frac{3600}{12} \Rightarrow x = ₹ 300$$

So, Rakesh's share = $7 \times 300 = ₹ 2100$

Lokesh's share = $2 \times 300 = ₹ 600$

Mukesh's share = $3 \times 300 = ₹ 900$

14. For 400 students, the monthly consumption of cereals of a hostel

$$= 5200 \text{ kg}$$

for 1 student, the monthly consumption of cereals of a hostel = $\frac{5200}{400}$

$$= 13 \text{ kg}$$

For 260 students, the monthly consumption of cereals of a hostel

$$= 13 \times 260 = 3380 \text{ kg}$$

15. Pumping set needs the power for raising 1500 litre of water = 1.5 km

Pumping set will need the power for raising 4500 litre of water

$$= \frac{1.5}{1500} \times 4500 = 4.5 \text{ km.}$$

16. Yes, infinitely many lines.



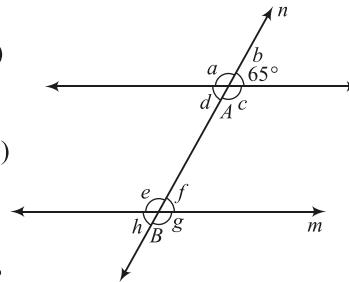
Annual Model Test Paper

1. Do it yourself.
2. Do it yourself.
3. (i) Vertex – Y , Arms = YX, YZ
 (ii) Vertex – M , Arms – MN, ML
 (iii) Vertex – P , Arms – PQ, PR
 (iv) Vertex – B Arms – BA, BC
4. Do it yourself.
5. $\angle b = \angle f$ (Corresponding angles)

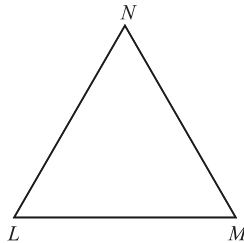
$$\begin{aligned} \therefore \quad \angle f &= 65^\circ \\ \angle f &= \angle d && \text{(Alternate angles)} \\ \therefore \quad \angle d &= 65^\circ \\ \angle d &= \angle h && \text{(Corresponding angles)} \\ \therefore \quad \angle h &= 65^\circ \\ \angle e + \angle d &= 180^\circ && \text{(Interior supplementary angles)} \\ \angle e + 65^\circ &= 180^\circ \quad (\because \angle d = 65^\circ) \\ \therefore \quad \angle e &= 180^\circ - 65^\circ = 115^\circ \\ \angle e &= \angle a && \text{(Corresponding angles)} \end{aligned}$$

$$\begin{aligned} \therefore \quad \angle a &= 115^\circ \\ \angle e &= \angle c && \text{(Alternate angles)} \\ \therefore \quad \angle c &= 115^\circ \\ \angle c &= \angle g && \text{(Corresponding angles)} \\ \therefore \quad \angle g &= 115^\circ \end{aligned}$$

Thus,
 $\angle c = \angle g = \angle a = \angle e = 115^\circ$
 and $\angle b = \angle f = \angle d = \angle h = 65^\circ$



6. Triangle, $\triangle LMN$



7. (i) Right-angled Triangle [One-right angle]
 (ii) Obtuse-angled triangle [One obtuse angle]
 (iii) Acute-angled triangle [All three angles are acute]

- (iv) Obtuse-angled triangle [One obtuse angle]
- (v) Right-angled triangle [One-right angle]
- (vi) Acute-angled triangle [All three angles are acute]

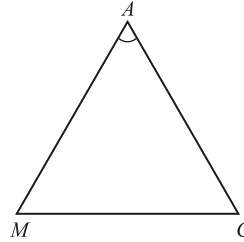
5. $\angle A = \angle B = \angle C$

We know that the sum of three angles of a triangle = 180°

$$\angle A + \angle B + \angle C = 180^\circ \quad \angle A + \angle A + \angle = 180^\circ$$

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

Each angle of triangle is 60° .



9. Do it yourself.

10. Do it yourself.

11. Do it yourself.

12. (i) $3 \text{ cm} + 1.5 \text{ cm} + 2 \text{ cm} = 6.5 \text{ cm}$

(ii) $8 \text{ m} + 10 \text{ m} + 6 \text{ m} = 24 \text{ m}$

(iii) $25 \text{ cm} + 23 \text{ cm} + 24 \text{ cm} = 72 \text{ cm}$

(iv) $10 \text{ cm} + 10 \text{ cm} + 10 \text{ cm} = 30 \text{ cm}$

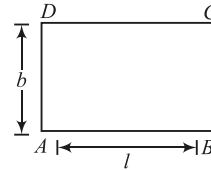
13. Distance covered by Sweety = $4 \times 75 \text{ m} = 300 \text{ m}$

Distance covered by Bulbul = $2 \times (60 + 45) \text{ m} = 2 \times 105 \text{ m} = 210 \text{ m}$

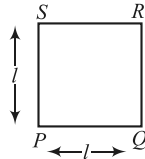
Since $300 \text{ m} > 210 \text{ m}$

\therefore Bulbul covered smaller distance

14. Let $ABCD$ be a rectangle with length l and breadth b and $PQRS$ be a square of side l (equal to the length of given rectangle). Now, square $PQRS$ will have larger area than that of rectangle $ABCD$, because for $ABCD$ to be a rectangle, $b < l$ (Its breadth must be less than its length).



So, by comparing areas of both we can clearly see that area of square is larger.



Area of rectangle = $l \times b$, $b < l$

Area of square = $l \times l$

$l \times l > l \times b$

Area of square $PQRS >$ Area of rectangle $ABCD$.

15. (i) $4 \times 1 + 6 \times 2 + 5 \times 3 + 3 \times 4 + 2 \times 5 = 4 + 12 + 15 + 12 + 10$

$= 53$ workers

(ii) 10 shops (iii) 10 shops

