

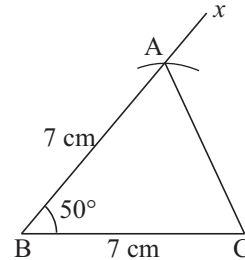
### Exercise 20.2

1. (a) All angles of an equilateral triangle are **60° each**.
  - (b) In a right triangle, the other two angles are always **acute**.
  - (c) If a triangle has angles 65° and 43°, then the third angle is **180 – (65 + 43) = 72°**.
  - (d) An acute triangle has all its angles smaller than **90°**.
  - (e) The sum of the lengths of two sides of a triangle is always **greater** than the third side.
2. (a)  $\because BC + AC < AB$   
 $\therefore$  triangles is not possible
  - (b)  $\because \angle A + \angle B + \angle C = 60 + 65 + 55 = 180^\circ$   
 Yes triangle is possible
  - (c)  $\because AB + BC > AC$   
 $AB + AC > BC$   
 $BC + AC > AB$   
 $\therefore$  triangles is possible
  - (d)  $\because \angle A + \angle B + \angle C = 90 + 50 + 50 = 190 \neq 180$   
 $\therefore$  triangle is not possible
  - (e)  $\because PQ + PR > QR$   
 $PQ + QR > PR$   
 $PR + QR > PQ$   
 $\therefore$  triangle is possible
  - (f)  $\because \angle P + \angle Q + \angle R = 40 + 40 + 40 = 120 \neq 180^\circ$   
 $\therefore$  triangle is not possible
3. (a)  $\because \angle A + \angle B + \angle C = 180$   
 $55^\circ + 72^\circ + \angle C = 180$   
 $127 + \angle C = 180$   
 $\angle C = 180 - 127$   
 $\angle C = 53^\circ$
  - (b)  $\because \angle P + \angle Q + \angle R = 180^\circ$   
 $37^\circ + 82^\circ + \angle R = 180$   
 $119^\circ + \angle R = 180$   
 $\angle R = 180 - 119$   
 $\angle R = 61^\circ$
  - (c)  $\because \angle x + \angle y + \angle z = 180$   
 $105 + 30 + \angle z = 180$   
 $135^\circ + \angle z = 180$   
 $\angle z = 180 - 135$   
 $\angle z = 45^\circ$
  - (d)  $\because \angle D + \angle E + \angle F = 180$   
 $86 + 50^\circ + \angle F = 180$   
 $136^\circ + \angle F = 180$   
 $\angle F = 180 - 136 = 44^\circ$

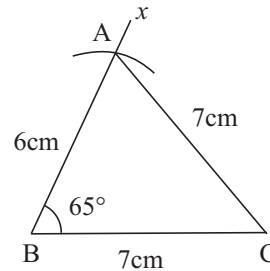
4. (a) acute angled triangle (b) right angled triangle (c) obtuse angled triangle  
 (d) obtuse angled triangle (e) obtuse angled triangle.

**Exercise 20.3**

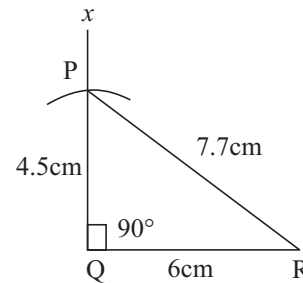
1. (a) steps of construction
1. Draw  $BC = 7$  cm
  2. At  $B$  draw  $\angle xBC = 50^\circ$
  3. With  $B$  as centre and radius equal to 7 cm cut an Arc  $A$  on  $Bx$ . Join  $AC$   
 third side = 5.8 cm  
 other angles are  $65^\circ$  and  $65^\circ$



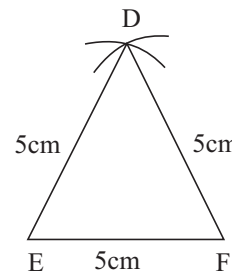
2. steps of construction
1. Draw  $BC = 7$  cm.
  2. At  $B$  draw  $\angle xBC = 65^\circ$ .
  3. With  $B$  as centre and radius = 6 cm cut an arc  $A$  on  $Bx$ .  
 Join  $AC$   
 third side = 7 cm  
 other angles are  $65^\circ$  and  $50^\circ$



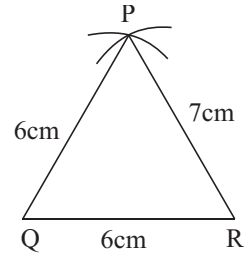
3. (a) Steps of construction :
1. Draw  $QR = 6$  cm.
  2. At  $Q$  draw  $\angle XQR = 90^\circ$ .
  3. With  $Q$  as centre and radius equal to 4.5 cm cut an arc  $P$  on  $OX$ .
  4. Join  $PR$ .  
 third side = 7.7 cm



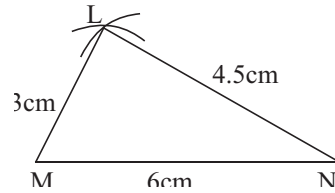
- (b) Steps of construction :
1. Draw  $EF = 5$  cm.
  2. With  $E$  as centre and radius equal to 5 cm draw an arc.
  3. With  $F$  as centre and radius = 5 cm cut the previous arc at  $D$ .
  4. Join  $DE, DF$ .
- $\therefore \triangle DEF$  is required triangle



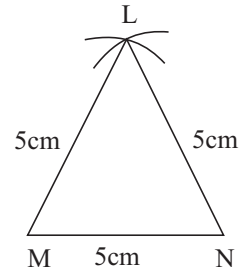
4. (a) Steps of construction
1. Draw  $QR = 6$  cm
  2. With  $Q$  as centre and radius equal to 6 cm draw an arc.
  3. With  $R$  as centre and radius equal to 7 cm cut the previous as  $C$  at  $P$ .
  4. Join  $PQ, PR$
- $\therefore \triangle PQR$  is required triangle



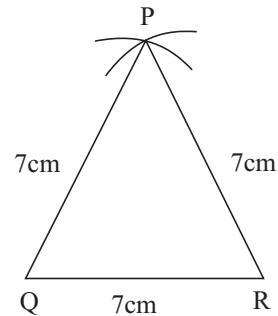
- (b) Steps of construction
1. Draw  $MN = 6$  cm.
  2. With  $M$  as centre and radius = 3 cm draw an arc.
  3. With  $N$  as centre and radius equal to 4.5 cm cut the previous arc at  $L$ .
- Join  $LM, LN$
- $\therefore \triangle LMN$  is required triangle.



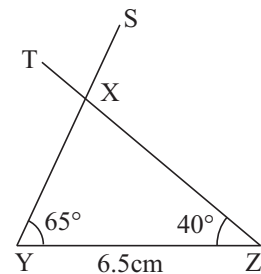
- (c) Steps of construction
1. Draw  $MN = 5$  cm.
  2. With  $M$  as centre and radius equal to 5 cm draw an arc.
  3. With  $N$  as centre and radius equal to 5 cm cut the previous arc at  $L$ .
- Join  $LM, LN$
- $\therefore \triangle LMN$  is required triangle.



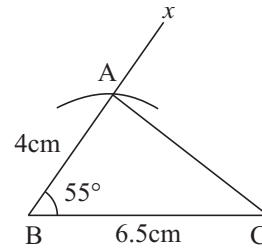
- (d) Steps of construction
1. Draw  $QR = 7$  cm.
  2. With  $Q$  as centre and radius equal to 7 cm draw an arc.
  3. With  $R$  as centre and radius = 7 cm cut the previous arc at  $P$ .
- Join  $PQ, PR$
- $\therefore \triangle PQR$  is required triangle



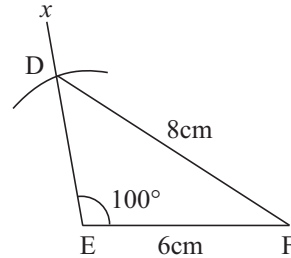
- (e) Steps of construction
1. Draw  $YZ = 6.5$  cm.
  2. At  $Y$  draw  $\angle SYZ = 65^\circ$ .
  3. At  $Z$  draw  $\angle TZY = 40^\circ$ .
- Meeting  $YS$  at  $X$
- $\therefore \triangle XYZ$  is required triangle.



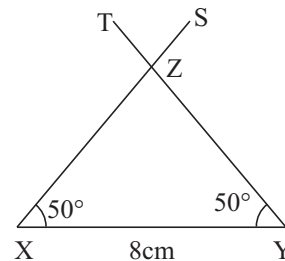
- (f) Steps of construction
1. Draw  $BC = 6.5$  cm.
  2. At  $B$  draw  $\angle XBC = 55^\circ$ .
  3. With  $B$  as centre and radius = 4 cm cut an arc  $A$  on  $Bx$ .
  4. Join  $AC$
- $\therefore \triangle ABC$  is required triangle.



- (g) Steps of construction
1. Draw  $EF = 6$  cm.
  2. At  $E$  draw  $\angle xEF = 100^\circ$ .
  3. With  $F$  as centre and radius = 8 cm cut an Arc  $D$  on  $Ex$ .
  4. Join  $DF$
- $\therefore \triangle DEF$  is required triangle.



- (b) Steps of construction
1. Draw  $XY = 8$  cm.
  2. At  $X$  draw  $\angle SXY = 50^\circ$ .
  3. At  $Y$  draw  $\angle TYZ = 50^\circ$ .
- Meeting  $XS$  at  $Z$ .
- $\therefore \triangle XYZ$  is required triangle.



### Exercise 20.4

- (a) False      (b) True      (c) False      (d) False

(e) False      (f) True      (g) True.      (h) True
- (a) Quadrilateral with two pairs of parallel sides are **always parallelogram**.

(b) Polygons with all right angles are **sometimes** squares.

(c) A square is **always** a quadrilateral.

(d) A polygon with three equal sides is **always** a triangle.

(e) A rhombus is **always** a parallelogram.

(f) A trapezium **never** has two parallel sides.

(g) A rhombus is **sometimes** a square.

(h) The sum of all the angles of a quadrilateral is **always**  $360^\circ$ .

(i) The sum of all the angles of a triangle is **never**  $170^\circ$ .
- (a)  $\therefore \angle P + \angle Q + \angle R + \angle S = 360$

$\therefore 75 + 75 + 105 + \angle S = 360$

$255 + \angle S = 360$

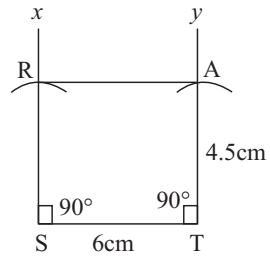
$\angle S = 360 - 255^\circ$

$\angle S = 105^\circ$

- (b)  $\therefore \angle L + \angle M + \angle N + \angle O = 360$   
 $90 + 90 + 90 + \angle O = 360$   
 $270 + \angle O = 360$   
 $\angle O = 360 - 270$   
 $\angle O = 90^\circ$
- (c)  $\therefore \angle P + \angle Q + \angle R + \angle S = 360$   
 $65 + 140 + 65 + \angle S = 360$   
 $270 + \angle S = 360$   
 $\angle S = 360 - 270$   
 $\angle S = 90^\circ$
- (d)  $\therefore \angle W + \angle X + \angle Y + \angle Z = 360$   
 $64 + 138 + 110 + \angle Z = 360$   
 $312 + \angle Z = 360$   
 $\angle Z = 360 - 312$   
 $\angle Z = 48^\circ$
- (e)  $\therefore \angle A + \angle B + \angle C + \angle D = 360$   
 $100 + 65 + 80 + \angle D = 360$   
 $245 + \angle D = 360$   
 $\angle D = 360 - 245$   
 $\angle D = 115^\circ$

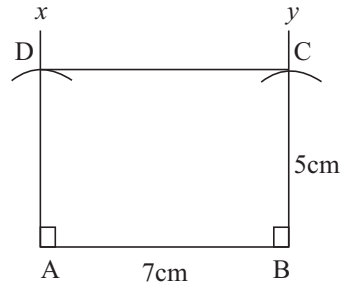
4. (a) Steps of construction

1. Draw  $ST = 6$  cm.
  2. At  $S$  draw  $\angle xST = 90^\circ$ .
  3. At  $T$  draw  $\angle yTS = 90^\circ$ .
  4. With  $S$  as centre and radius equal to 4.5 cm cut an arc  $R$  on  $Sx$ .
  5. With  $T$  as centre and radius equal to 4.5 cm cut an arc  $A$  on  $Ty$ . Join  $RA$ .
- $\therefore STAR$  is required rectangle.

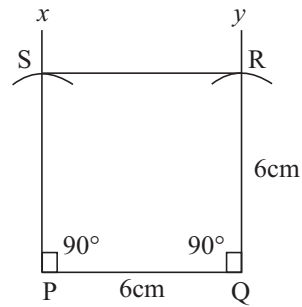


(b) Steps of construction

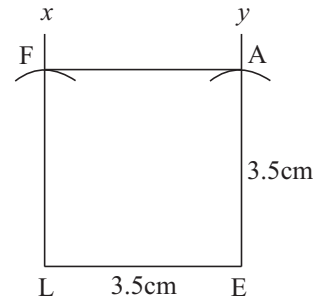
1. Draw  $AB = 7$  cm.
  2. At  $A$  draw  $\angle xAB = 90^\circ$ .
  3. At  $B$  draw  $\angle yBA = 90^\circ$ .
  4. With  $B$  as centre and radius equal to 5 cm cut an arc  $C$  on  $By$ .
  5. With  $A$  as centre and radius equal to 5 cm cut an arc  $D$  on  $Ax$ . Join  $DC$ .
- $\therefore ABCD$  is required rectangle.



- (c) steps of construction
1. Draw  $PQ = 6$  cm.
  2. At  $P$  draw  $\angle xPQ = 90^\circ$ .
  3. At  $Q$  draw  $\angle yQP = 90^\circ$ .
  4. With  $P$  as centre and radius equal to 6 cm cut an Arc  $S$  on  $Px$ .
  4. With  $Q$  as centre and radius equal to 6 cm cut an Arc  $R$  on  $Qy$ .
  5. Join  $SR$



- $\therefore PQRS$  is required square.
- (d) Steps of construction
1. Draw  $LE = 3.5$  cm.
  2. At  $L$  draw  $\angle xLE = 90^\circ$ .
  3. At  $E$  draw  $\angle yEL = 90^\circ$ .
  4. With  $L$  as centre and radius equal to 3.5 cm cut an arc  $F$  on  $Lx$ .
  5. With  $E$  as centre and radius equal to 3.5 cm cut an arc  $A$  on  $Ey$ . Join  $FA$
- $\therefore LEAF$  is required square.



5. (a) Parallelogram      (b) Square      (c) Rectangle  
 (c) Trapezium      (d) Square      (e) Rectangle  
 (g) Parallelogram      (h) Trapezium      (i) Square

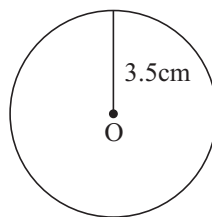
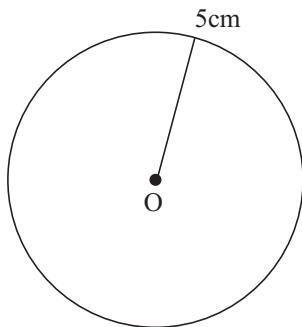
## 21. CIRCLES AND SATIAL GEOMETRY

### Exercise 21.1

- (a) Name the centre of the circle.  $O$
  - (b) Name an arc of the circle.  $AQ$
  - (c) Name the diameter of the circle.  $AB$
  - (d) Name a chord.  $YX$
  - (e) Name the three radii.  $OA, OC, OB$
  - (f) Name the largest chord of this circle.  $AB$
- (a) interior  $M, P, T, X$
  - (b) exterior  $A, N, D, R$
  - (c) on the circle  $L, Y$
- (a) True      (b) False      (c) True      (d) True      (e) False.
- (a) In a circle, the distance is same from the **centre** to all points on the circle.
  - (b) A line segment joining the centre of a circle and any point on the circle is called its **radius**.
  - (c) Diameter = **2** times the radius.
  - (d) Radius = **half** of the diameter.
  - (e) The **diameter** is the longest chord of a circle.

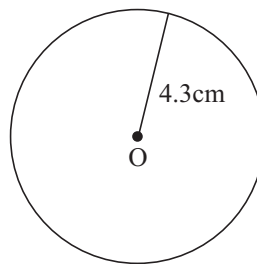
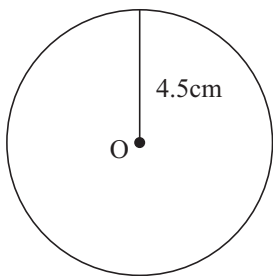
### Exercise 21.2

1. The diameter of a circle is 74 cm. Its radius is **37 cm**.
2. circumference =  $3 \times$  diameter (app.)  
 $= 3 \times 9 = 27$  cm (app.)
3. A semi-circle is **half** of a circle.
4. (a) 7 cm = 3.5 cm      (b) 13 cm = 6.5 cm      (c) 16 cm = 8 cm
5. (a) 2.5 cm = 5 cm      (b) 4.5 = 9 cm      (c) 6 cm = 12 cm
6. (a) circumference =  $3 \times$  diameter (app.)  
 $= 3 \times 6.5$  cm  
 $= 19.5$  cm (app.)  
 (b) circumference =  $3 \times$  diameter (app.)  
 $= 3 \times 7 = 21$  cm (app.)  
 (c) circumference =  $3 \times$  diameter  
 $= 3 \times 9.4$  cm  
 $= 28.2$  cm
7. (a)  $r = 5$  cm      (b)  $r = \frac{7}{2}$  cm = 3.5 cm

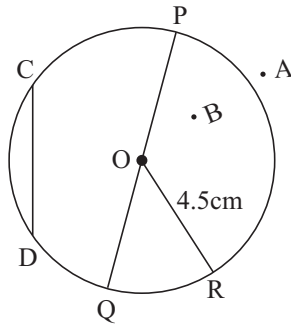


(c)  $r = 4.5$  cm

(d)  $r = \frac{8.6}{2}$  cm = 4.3 cm

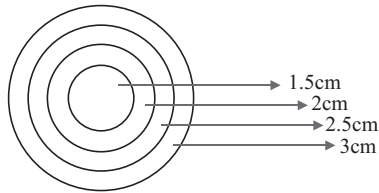


8.  $r = \frac{d}{2} = \frac{9}{2} = 4.5 \text{ cm}$



**WORKSHEET**

Measure the length of radius of each circle :



**22. DATA HANDLING**

**Exercise 22.1**

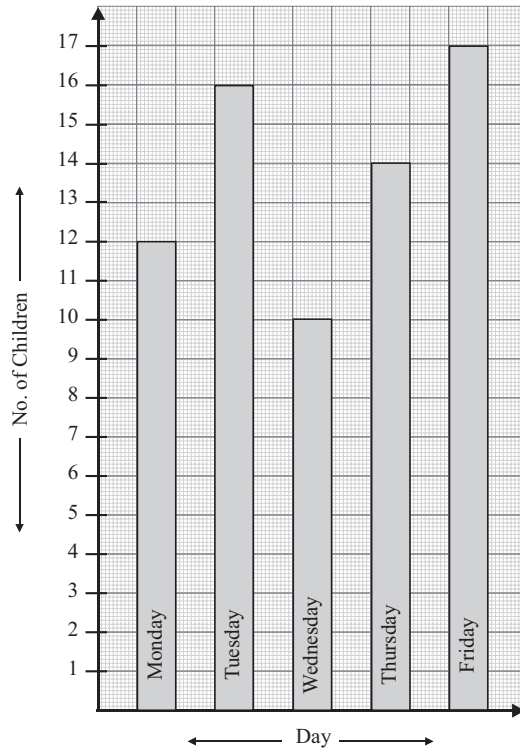
1.

Marks	Tally Mark	Frequency
10		1
11		3
12	/	5
13		2
14		1
15		4
16		2
17		2
18		3
19		4
20		3
		<hr/> 30





2.



3.

Weight of students	Tally mark	Frequency
35		4
36	-	0
37		5
38		8
39		2
40		1
41	-	0
42		12
43	-	0
44	-	0
45		3
		Total <u>35</u>



4. (a) Adventure programme is most popular among the children.  
 (b) Sports programme is least popular among the children.  
 (c) Comedy is more popular.  
 (d)  $14 + 12 + 7 + 9 + 18 = 60$  children were interviewed.

**Exercise 22.2**

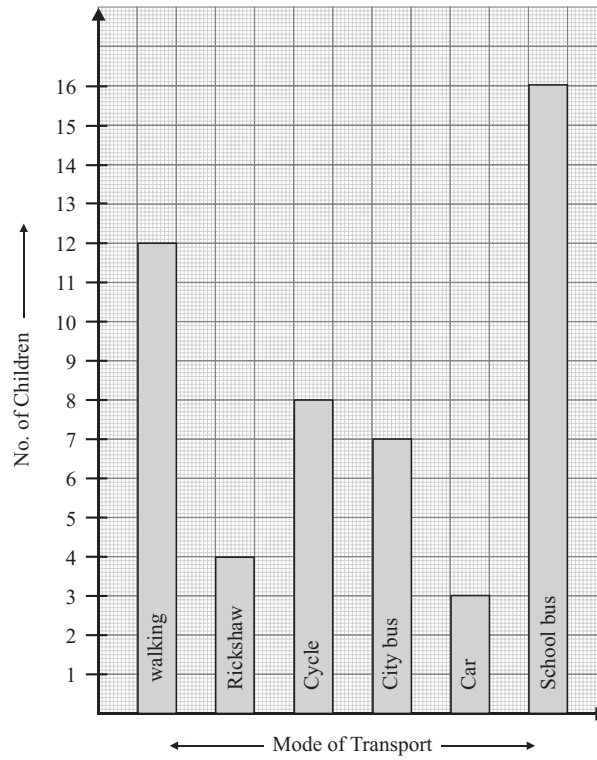
1. (a) district II = 60 medals  
 district IV = 50 medals  
 $\therefore$  district II won 10 more medals than district IV  
 (b) district VI won least medals.  
 (c) No  
 (d) Total medals won =  $40 + 60 + 30 + 50 + 20 + 10 = 210$
- 2.

Mode of transport	No. of students
School bus	
Rickshaw	
Walking	
Private Van	
Own conveyance	

scale = 2 students



3.



**Exercise 22.3**

1. a

Colour	Girls	Boys	Total Number of Children
Red	5	3	8
Blue	2	4	6
Green	4	7	11
Yellow	8	5	13
Black	8	9	17

Hint : Total number = Number of Girls + Number of boys 55

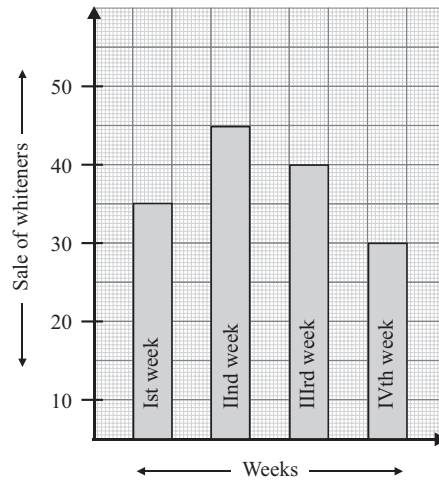
- (a) Black      (b) Blue      (c) Yellow, black      (d) Black
- (e) 55      (f) Blue      (g) Red      (h) Yellow.



2.

Item sold	Whitener	Pencils	Crayons	Sharpener	File sheets (in packets)
1st week	35	50	25	25	15
2nd week	45	60	30	35	10
3rd week	40	45	30	30	25
4th week	30	35	20	15	40

- (a) 2nd week                      (b) file sheets                      (c) 3rd week  
 (d) 15,  $(190 - 105 = 85)$   
 (e)



3. (a) School B                      (b) School C  
 (c) Athletics                      (d) 120  
 (e)

Name of School	No. of persons playing T-T
A	6 smiley faces
B	5 smiley faces
C	4 smiley faces
D	6 smiley faces

scale ☺ = 2 students

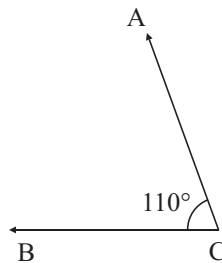
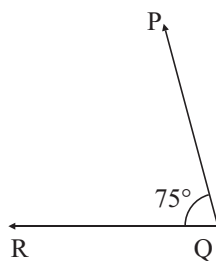
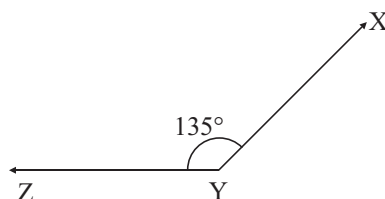
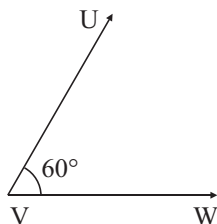


### Exercise 22.4

- (a) Cricket                      (b) Hockey                      (c) Basketball  
 (d) Cricket and tennis      (e) Football, tennis.
- (a) (Romance, drama) (Horror, foreign)      (b) Action  
 (c) Comedy and Action                      (d) Comedy  
 (e) 11%.
- (a) dogs, 30%                      (b) Birds, 10%  
 (c) 20%                              (d) Dogs and cats.

### Formative Assessment-4

1. (a)

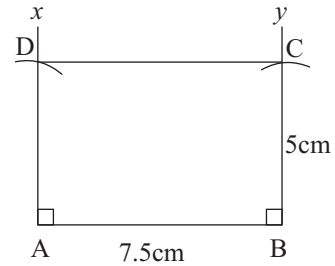


- (a)  $\because \angle ABC + \angle BAC + \angle ACB = 180$   
 $25 + 55 + \angle ACB = 180$   
 $80 + \angle ACB = 180$   
 $\angle ACB = 180 - 80$   
 $\angle ACB = 100$

(b)  $\because \angle XYZ + \angle YXZ + \angle XZY = 180$   
 $50 + 90 + \angle XZY = 180$   
 $140 + \angle XZY = 180$   
 $\angle XZY = 180 - 140 = 40^\circ$
- (a)  $\because 115 + 65 = 180$ , yes angles are supplementary  
 (b)  $\because 59 + 111 = 170 \neq 180$ , No angles are not supplementary  
 (c)  $\because 87 + 93 = 180$ , Yes angles are supplementary  
 (d)  $\because 76 + 84 = 160 \neq 180$ , No angles are not supplementary
- Steps of construction

  - Draw  $AB = 7.5$  cm.
  - At  $A$  draw  $\angle xAB = 90^\circ$ .

3. At  $B$  draw  $\angle yBA = 90^\circ$ .
4. With  $A$  as centre and radius = 5 cm cut an arc  $D$  on  $Ax$ .
5. With  $B$  as centre and radius = 5 cm cut an arc  $C$  on  $By$ .
6. Join  $DC$   
 $\therefore ABCD$  is required Rectangle.



5. Diameter =  $2 \times$  radius  
 $= 2 \times 6 = 12$  cm
6. There are six types of angles they are :  
**(a)** Acute angle      **(b)** Obtuse angle      **(c)** right angle  
**(d)** straight angle      **(e)** Reflex angle      **(f)** whole angle.
7. In Rectangle all angles are  $90^\circ$  where as in parallelogram only opposite angles are equal.
8. **(a)** An **acute** angle is less than  $90^\circ$ .  
**(b)** There are  **$90^\circ$**  degrees in a right angle.  
**(c)** A circle is made up of  **$360^\circ$** .
9. **(a)** (Romance, drama), (Horror, Foreign)      **(b)** Action  
**(c)** (Comedy and Action)      **(d)** Comedy  
**(e)** 11%
- 10.

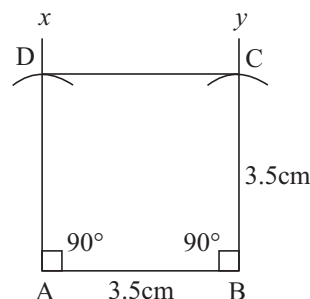
Marks	Tally mark	Frequency
10		1
11		3
12		5
13		2
14		1
15		4
16		2
17		2
18		3
19		4
20		3
		Total 30

## Summative Assessment-2

1. (a)  $d = 1200$  km speed = 400 km/hr  
 $\therefore t = \frac{d}{s} = \frac{1200}{400} = 3$  hrs
- (b)  $d = 175$  m speed = 25 m/s  
 $\therefore t = \frac{d}{s} = \frac{175}{25} = 7$  seconds.
2.  $\therefore$  Volume =  $l \times b \times h$   
 $15700 = l \times 12 \times 10$   
 $\frac{15700}{12 \times 10} = \text{length} \Rightarrow 130.83 \text{ m} = \text{length}$
3.  $\therefore$  Average =  $\frac{\text{total expenditure}}{\text{total months}} = \frac{1694}{7} = 242$

4. Steps of construction

1. Draw  $AB = 3.5$  cm.
2. At  $A$  draw  $\angle XAB = 90^\circ$ .
3. At  $B$  draw  $\angle YBA = 90^\circ$ .
4. With  $A$  as centre and radius = 3.5 cm cut and arc  $D$  on  $AX$ .
5. With  $B$  as centre and radius = 3.5 cm. cut an arc  $C$  on  $BY$ .
6. Join  $DC$   
 $\therefore ABCD$  is required square.



5.  $\therefore$  Average Age =  $\frac{\text{total age}}{\text{total boys}} = \frac{35}{7} = 5$  years

6. here  $P = ₹ 3500$   $A = ₹ 4650$   $t = 22$  years  
 $= 450 - 3500 = 1150$

$$\therefore I = A - P = 4650 - 3500 = 1150$$

$$\therefore r = \frac{I \times 100}{P \times t} = \frac{1150 \times 100}{3500 \times 2} \Rightarrow \text{rate} = 16.42\%$$

7.  $\therefore$  SP = CP + Profit = ₹ 1500 + ₹ 250  
 SP = ₹ 1750

8. (a)  $\therefore d = 2 \times r$   
 $= 2 \times 15$   
 $= 30$  cm

- (b)  $\therefore d = 2 \times \text{radius}$   
 $= 2 \times 3.2$   
 $= 6.4$  cm

9. (a) Chord (b) circumference

10. (a)  $\triangle ABC$  acute angled triangle equilateral triangle

(b)  $\triangle PQR$  right angle triangle

(c)  $\triangle XYZ$  obtuse angled triangle

(d)  $\triangle UVW$  obtuse angled triangle

11. (a) Parallel lines (b) intersecting lines (c) intersecting lines  
 (d) parallel lines (e) intersecting lines (f) parallel lines