## EXERCISE PAGE: 23

**In each of the questions 1 to 16, out of four options only one is correct. Write the correct answer.**

**1. Number of lines passing through five points such that no three of them are collinear is**

**(A) 10 (B) 5 (C) 20 (D) 8**

**Solution:-**

(A) 10

From the question it is given that, number of lines passing through five points.

We know that, we need tow points to form a line.

Therefore, number of lines passing through five points = 5 × 2

= 10

**2. The number of diagonals in a heptagon is**

**(A) 21 (B) 42 (C) 7 (D) 14**

**Solution:-**

(D) 14

From the formula, diagonal = n(n - 3)/2

Where n = number of sides in a polygon.

There are 7 sides in a heptagon.

So, d = 7(7 - 3)/2

= 7(4)/2

= 28/2

= 14

**3. Number of line segments in Fig. 2.5 is**

**(A) 5 (B) 10 (C) 15 (D) 20**


Fig. 2.5

**Solution:-**

(C) 15

From the figure, number of line segments are, AB, AC, AD, AE, BC, BD, BE, CD, CE, DE.

Therefore, there are 15 line segments in the given figure.

**4. Measures of the two angles between hour and minute hands of a clock at 9 O' clock are**

**(A) 60°, 300°** **(B) 270°, 90°**
**(C) 75°, 285°** **(D) 30°, 330°**

**Solution:-**

(B) 270°, 90°

We know that, measure of complete angle of clock is 360°.


From the figure, we can say that angle at 2 = (9/12) × 360°= 270°

Then, angle at 1= 360° – 270°

= 90°

Therefore, measures of the two angles between hour and minute hands of a clock at 9 O' clock are 270° and 90°.

**5. If a bicycle wheel has 48 spokes, then the angle between a pair of two consecutive spokes is**

**(A) 5½** **(B) 7½** **(c) 2/11** **(D) 2/15**

**Solution:-**

(B) 7½

We know that, bicycle wheel is in circular shape.

So, total angle of wheel is 360°.

From the question it is given that bicycle wheel has 48 spokes.

Then, the angle between a pair of two consecutive spokes is = 360°/48

= 7.5

= 7½

**6. In Fig. 2.6, ∠XYZ cannot be written as**

**(A) ∠Y** **(B) ∠ZXY** **(C) ∠ZYX** **(D) ∠XYP**

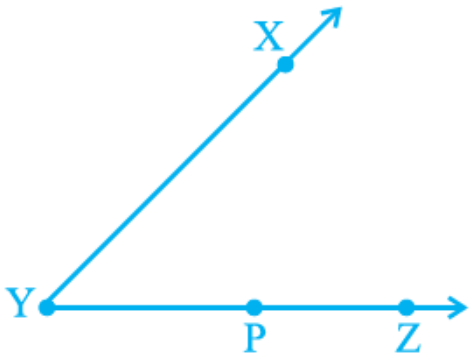


Fig. 2.6

**Solution:-**
(B) ∠ZXY

**7. In Fig 2.7, if point A is shifted to point B along the ray PX such that PB = 2PA, then the measure of ∠BPY is**
**(A) greater than 45°** **(B) 45°**
**(C) less than 45°** **(D) 90°**

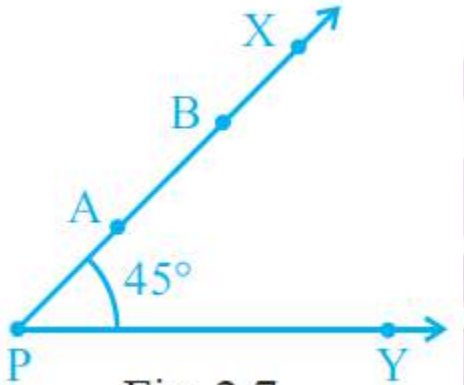


Fig. 2.7

**Solution:-**
(B) 45°
As per the condition given the question, point A is shifted to point B along the ray PX such that PB = 2PA.
So, by shifting the point 'A' there is no change at the point 'P'.
Therefore, the measure of ∠BPY is 45°.

**8. The number of angles in Fig. 2.8 is**
**(A) 3** **(B) 4** **(C) 5** **(D) 6**

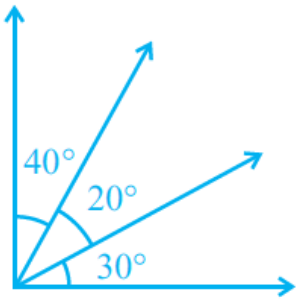



Fig. 2.8

**Solution:-**

(D) 6

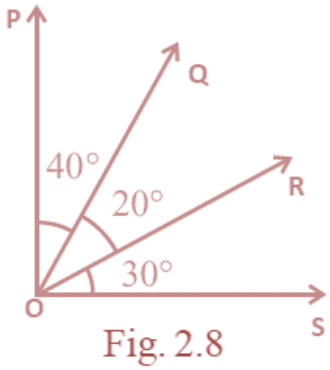



Fig. 2.8

From the above figure,

Angle are, ∠POS, ∠QOS, ∠ROS, ∠POQ, ∠QOR, ∠ROS.

Therefore, number of angle formed are 6.

**9. The number of obtuse angles in Fig. 2.9 is**

**(A) 2 (B) 3 (C) 4 (D) 5**

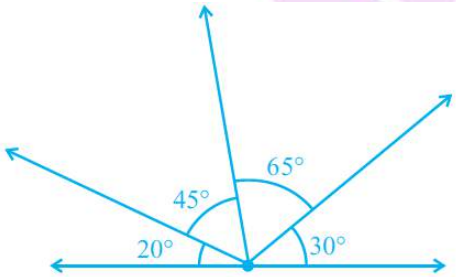



Fig. 2.9

**Solution:-**

(c) 4

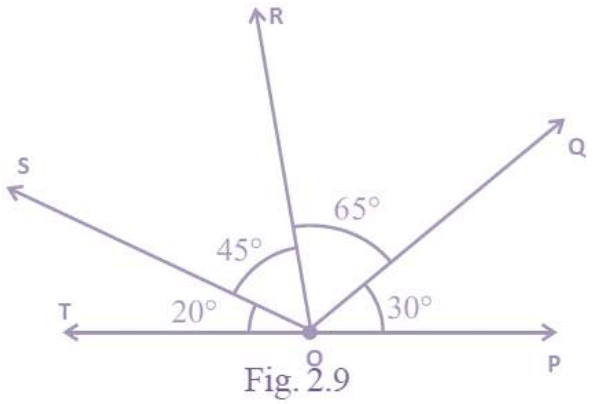


Fig. 2.9

Obtuse angle is defined as an angle formed is greater than 90° and less than 180°.
From the above figure,
Angle are, $\angle ROQ = \angle ROQ + \angle QOP$
$= 65^O + 30^O$
$= 95^O$
$\angle SOP = \angle ROQ + \angle QOP + \angle SOR$
$= 65^O + 30^O + 45^O$
$= 140^O$
$\angle SOQ = \angle SOR + \angle ROQ$
$= 45^O + 65^O$
$= 110^O$
$\angle TOQ = \angle TOS + \angle SOR + \angle ROQ$
$= 20^O + 45^O + 65^O$
$= 130^O$
Therefore, number of obtuse angle formed are 4.

**10. The number of triangles in Fig. 2.10 is**
**(A) 10 (B) 12 (C) 13 (D) 14**

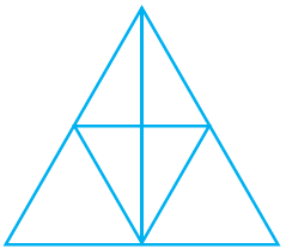
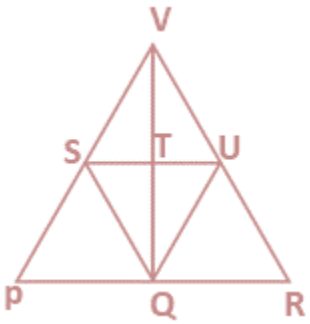


Fig. 2.10

**Solution:-**
(C) 13




By observing the above figure, there are 13 triangles.
ΔPVR, ΔPSQ, ΔSQU, ΔSQT, ΔTQU, ΔQUR, ΔVSU, ΔVST, ΔVTU, ΔPQV, ΔRQV, ΔVSQ, ΔVUQ

**11. If the sum of two angles is greater than 180°, then which of the following is not possible for the two angles?**
**(A) One obtuse angle and one acute angle**
**(B) One reflex angle and one acute angle**
**(C) Two obtuse angles**
**(D) Two right angles.**
**Solution: -**
(D) Two right angles.
Because, sum of all angles of right angles is must be equal to $180^o$.

**12. If the sum of two angles is equal to an obtuse angle, then which of the following is not possible?**
**(A) One obtuse angle and one acute angle.**
**(B) One right angle and one acute angle.**
**(C) Two acute angles.**
**(D) Two right angles.**
**Solution:-**
(D) Two right angles.
Because, sum of all angles of right angles is must be equal to $180^o$.
Right angle triangle does not contain obtuse angle.
Obtuse angle is defined as an angle formed is greater than $90^o$ and less than $180^o$.

**13. A polygon has prime number of sides. Its number of sides is equal to the sum of the two least consecutive primes. The number of diagonals of the polygon is**
**(A) 4 (B) 5 (C) 7 (D) 10**
**Solution:-**
(B) 5

The two least consecutive prime numbers are, 2 and 3
Sum of two numbers = 2 + 3 = 5
By using formula = n(n - 3)/2
= 5(5 - 3)/2
= (5 × 2)/2
= 10/2
= 5

**14. In Fig. 2.11, AB = BC and AD = BD = DC. The number of isosceles triangles in the figure is**

**(A) 1 (B) 2 (C) 3 (D) 4**

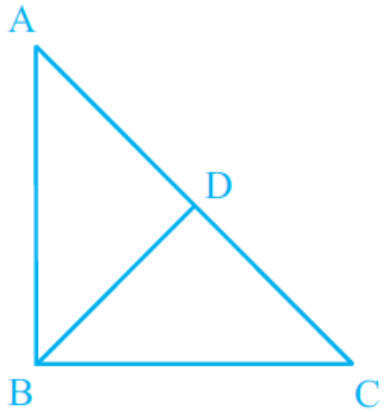


Fig. 2.11

**Solution:-**

(C) 3

From the figure, ΔABC, ΔABD and ΔCBD are isosceles triangle.

**15. In Fig. 2.12, ∠BAC = 90° and AD ⊥ BC. The number of right triangles in the figure is**

**(A) 1 (B) 2 (C) 3 (D) 4**

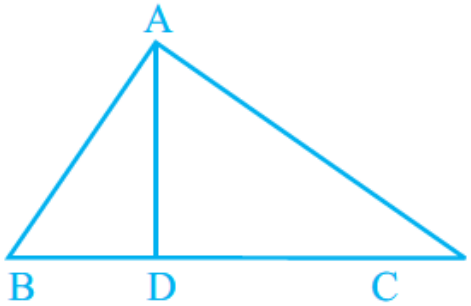


Fig. 2.12

**Solution:-**

(C) 3
From the figure, ΔABC, ΔABD and ΔADC are right triangle.

**16. In Fig. 2.13, PQ ⊥ RQ, PQ = 5 cm and QR = 5 cm. Then Δ PQR is**
**(A) a right triangle but not isosceles**
**(B) an isosceles right triangle**
**(C) isosceles but not a right triangle**
**(D) neither isosceles nor right triangle**

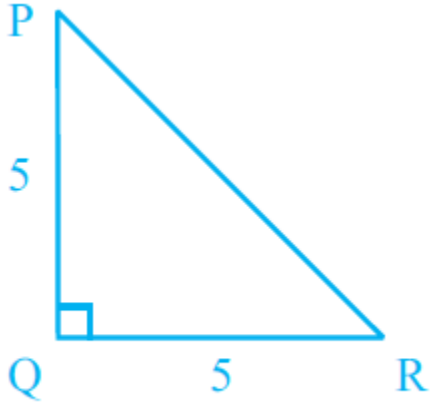


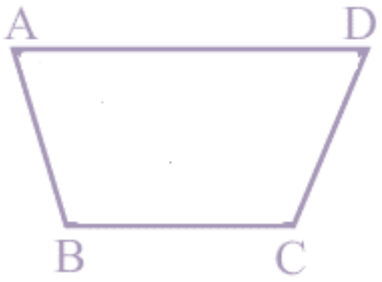
Fig. 2.13

**Solution:-**
(B) an isosceles right triangle
From the question it is given that, PQ ⊥ RQ, PQ = 5 cm and QR = 5 cm.
We know that, isosceles triangle has two equal side.
Therefore, the given ΔPQR is an isosceles right triangle.
**In questions 17 to 31, fill in the blanks to make the statements true:**
**17. An angle greater than 180° and less than a complete angle is called _____.**
**Solution:-**
An angle greater than 180° and less than a complete angle is called reflex angle.

**18. The number of diagonals in a hexagon is _____.**
**Solution:-**
The number of diagonals in a hexagon is 9.
We know that, hexagon has 6 sides.
By using the formula, number of diagonals = n(n - 3)/2
= 6(6 - 3)/2
= 6(3)/2

= 18/2
= 9

**19. A pair of opposite sides of a trapezium are _____.**
**Solution:-**
A pair of opposite sides of a trapezium are parallel.




**20. In Fig. 2.14, points lying in the interior of the triangle PQR are _____, that in the exterior are _____ and that on the triangle itself are _____.**

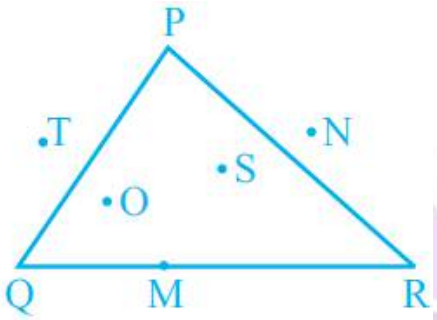



Fig. 2.14

**Solution:-**
In Fig. 2.14, points lying in the interior of the triangle PQR are right, that in the exterior are acute and that on the triangle itself are obtuse.

**21. In Fig. 2.15, points A, B, C, D and E are collinear such that AB = BC = CD = DE. Then**
**(a) AD = AB + _____**
**(b) AD = AC + _____**
**(c) mid point of AE is _____**
**(d) mid point of CE is _____**
**(e) AE = _____ × AB.**


Fig. 2.15

**Solution:-**

(a) AD = AB + BD

Where, BD = BC + CD

(b) AD = AC + CD

(c) mid point of AE is c

(d) mid point of CE is D

(e) AE = 4 × AB. [given]

**22. In Fig. 2.16,**

**(a) ∠AOD is a/an _____ angle**

**(b) ∠COA is a/an _____ angle**

**(c) ∠AOE is a/an _____ angle**

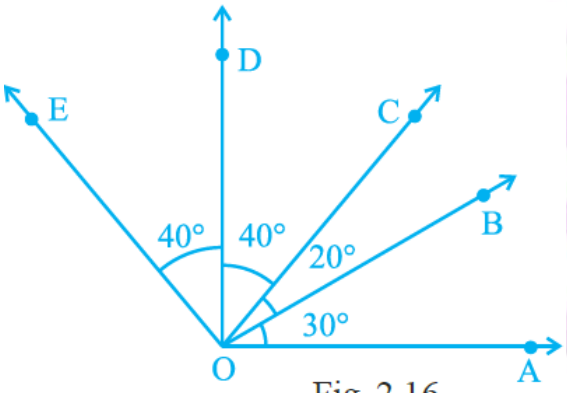



Fig. 2.16

**Solution:-**

From the figure,

(a) ∠AOD is a/an right angle.

Is anyone angle in the triangle is equal to 90° then the triangle is called right triangle.

∠AOD = ∠AOB + ∠BOC + ∠COD

= 30° + 20° + 40°

= 90°

(b) ∠COA is a/an acute angle

An acute angle is an angle formed between 0° to 90°.

∠COA = ∠COB + ∠BOA

= 20° + 30°

= 50°

(c) ∠AOE is a/an obtuse angle
An obtuse angle is an angle formed between $90^o$ to $180^o$.
∠AOE = ∠EOD + ∠DOC + ∠COB + ∠BOA
$= 40^o + 40^o + 20^O + 30^O$
$= 130^o$

**23. The number of triangles in Fig. 2.17 is _____. Their names are _____.**

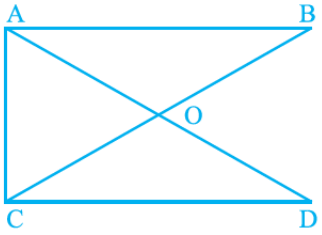


Fig. 2.17

**Solution:-**
The number of triangles in Fig. 2.17 is 5. Their names are ΔAOC, ΔCOD, ΔAOB, ΔACB, ΔACD.

**24. Number of angles less than 180° in Fig. 2.17 is _____and their names are ___ _____.**

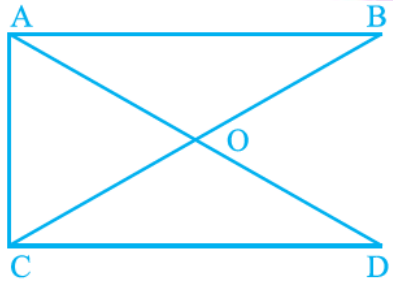


Fig. 2.17

**Solution:-**
Number of angles less than 180° in Fig. 2.17 is 12 and their names are ∠OAB, ∠OBA, ∠OAC, ∠OCA, ∠OCD, ∠ODC, ∠AOB, ∠AOC, ∠COD, ∠DOB, ∠BAC, ∠ACD.

**25. The number of straight angles in Fig. 2.17 is _____.**

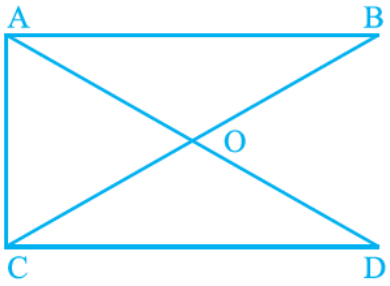


Fig. 2.17

**Solution:-**

The number of straight angles in Fig. 2.17 is four.

The angles are, ∠AOD, ∠BOC, ∠COB, ∠DOA.

**26. The number of right angles in a straight angle is _____ and that in a complete angle is _____.**

**Solution:-**

The number of right angles in a straight angle is tow and that in a complete angle is four.

We know that, angle formed by straight angle = 180°

and angle formed by right angle = 90°

So, number of right angles = 180°/90°= 2

We know that, complete angle = 360°

So, number of right angles = 360°/90°= 4

**27. The number of common points in the two angles marked in Fig. 2.18 is _____.**

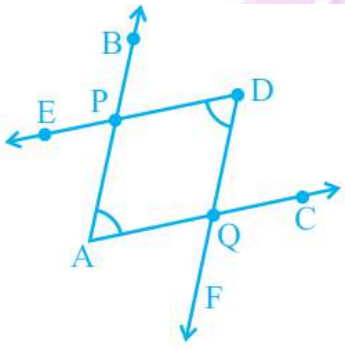


Fig. 2.18

**Solution:-**

The number of common points in the two angles marked in Fig. 2.18 is two.

From the given figure, the common points are P and Q.

**28. The number of common points in the two angles marked in Fig. 2.19 is _____.**

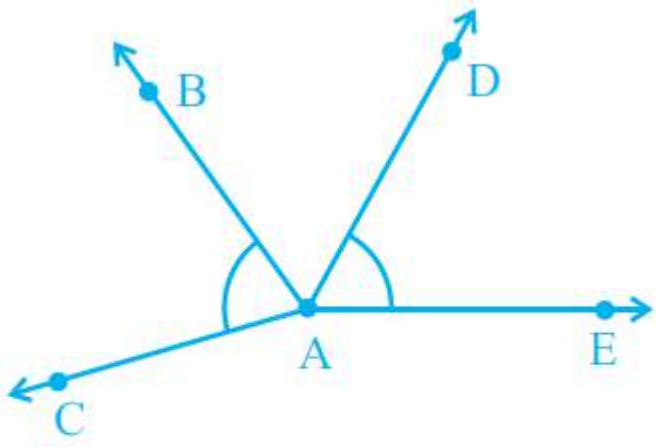



Fig. 2.19

**Solution:-**

The number of common points in the two angles marked in Fig. 2.19 is one.

From the given figure, the common point is A.

**29. The number of common points in the two angles marked in Fig. 2.20 _____ .**

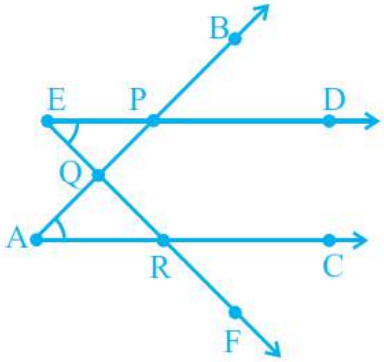



Fig. 2.20

**Solution:-**

The number of common points in the two angles marked in Fig. 2.20 three.

From the given figure, the common points are P, Q and R.

**30. The number of common points in the two angles marked in Fig. 2.21 is _____.**

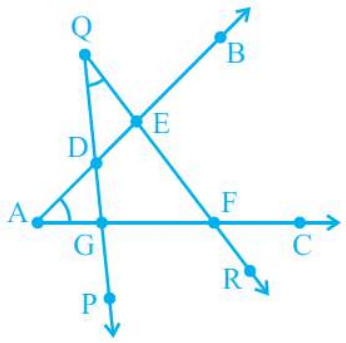



Fig. 2.21

**Solution:-**

The number of common points in the two angles marked in Fig. 2.21 is four.

From the given figure, the common points are D, E, F and G.

**31. The common part between the two angles BAC and DAB in Fig. 2.22 is _____.**

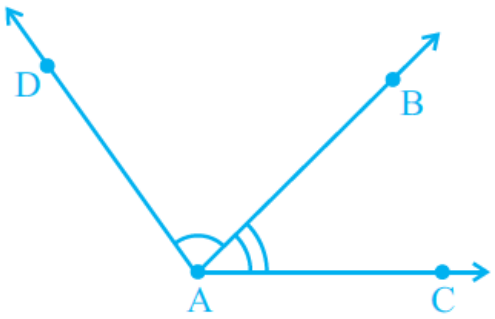



Fig. 2.22

**Solution:-**

The common part between the two angles BAC and DAB in Fig. 2.22 is ray AB.

**State whether the statements given in questions 32 to 41 are true (T) or false (F):**

**32. A horizontal line and a vertical line always intersect at right angles.**

**Solution:-**

True.

**33. If the arms of an angle on the paper are increased, the angle increases.**

**Solution:-**

False.

The angle is not affected, if the arms of an angle on the paper are increased or decreased.

**34. If the arms of an angle on the paper are decreased, the angle decreases.**
**Solution:-**
False.
The angle is not affected, if the arms of an angle on the paper are increased or decreased.

**35. If line PQ || line m, then line segment PQ || m.**
**Solution:-**
True.
From the question, line PQ || line m.
Then, parts of those lines are also parallel.
Therefore, line segment PQ || m.

**36. Two parallel lines meet each other at some point.**
**Solution:-**
False.
Parallel lines never meet each other.

**37. Measures of ∠ABC and ∠CBA in Fig. 2.23 are the same.**

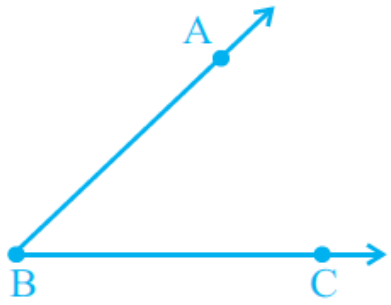



Fig. 2.23

**Solution:-**
True.
From the figure, both ∠ABC and ∠CBA contains common angle B.

**38. Two line segments may intersect at two points.**
**Solution:-**
False.
Because, two line segments are intersecting at only one point.

**39. Many lines can pass through two given points.**
**Solution:-**
False.
only one line can pass through two given points.

**40. Only one line can pass through a given point.**
**Solution:-**
False.
Infinite number of line can pass through a given point.

**41. Two angles can have exactly five points in common.**
**Solution:-**
False.
Two angles can have either one or two five points in common.