

Chapter 2: Geometry

NCERT Exemplar · Class 6 · Maths

Questions

Question 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

Solution:-

(A) 10

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

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

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

= 10

Question 2

The number of diagonals in a heptagon is

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

Solution

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.

$$\text{So, } d = 7(7 - 3)/2$$

$$= 7(4)/2$$

$$= 28/2$$

$$= 14$$

Question 3

Number of line segments in Fig. 2.5 is

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



Fig. 2.5

Solution

Solution:-

(B) 10

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

Therefore, there are 10 line segments in the given figure.

Question 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

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 = $(9/12) \times 360^\circ = 270^\circ$

Then, angle at 1 = $360^\circ - 270^\circ$

$$= 90^\circ$$

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

Question 5

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

(A) $5\frac{1}{2}$ (B) $7\frac{1}{2}$ (C) $2/11$ (D) $2/15$

Solution

Solution:-

(B) $7\frac{1}{2}$

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 = $360^\circ/48$

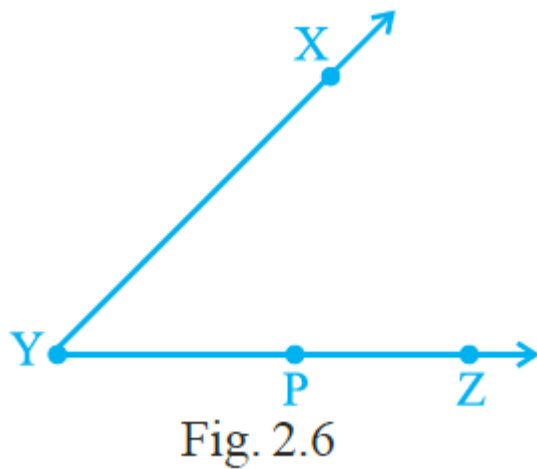
$$= 7.5$$

$$= 7\frac{1}{2}$$

Question 6

In Fig. 2.6, $\angle XYZ$ cannot be written as

- (A) $\angle Y$ (B) $\angle ZXY$ (C) $\angle ZYX$ (D) $\angle XYP$

**Solution**

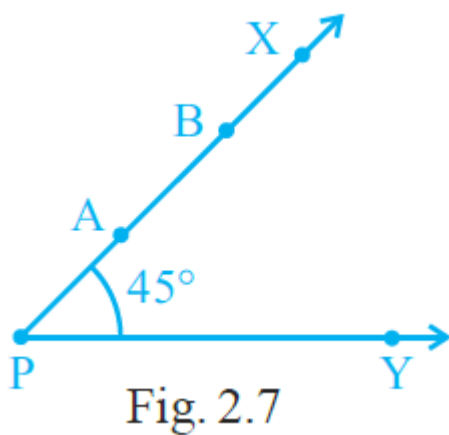
Solution:-

- (B) $\angle ZXY$

Question 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 $\angle BPY$ is

- (A) greater than 45° (B) 45°
(C) less than 45° (D) 90°



Solution**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 $\angle BPY$ is 45° .

Question 8

The number of angles in Fig. 2.8 is

(A) 3 (B) 4 (C) 5 (D) 6

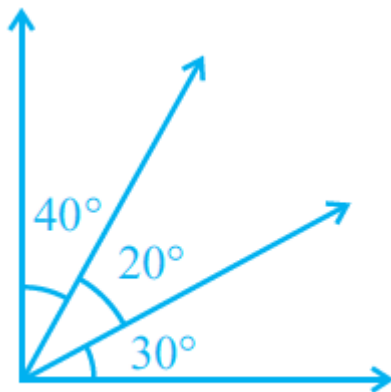
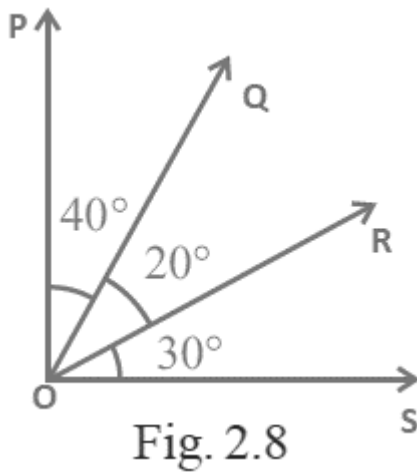


Fig. 2.8

Solution**Solution:-**

(D) 6



From the above figure,

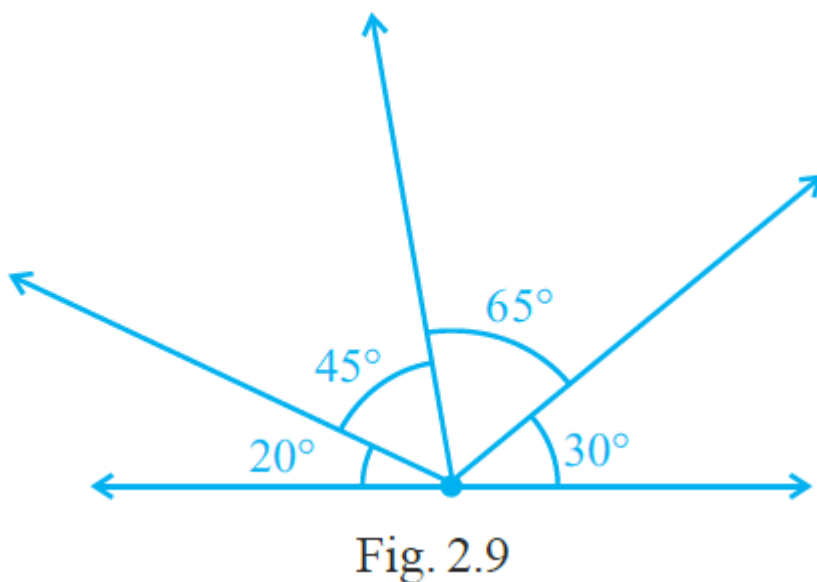
Angle are, $\angle POS$, $\angle QOS$, $\angle ROS$, $\angle POQ$, $\angle QOR$, $\angle ROS$.

Therefore, the number of angles formed is 6.

Question 9

The number of obtuse angles in Fig. 2.9 is

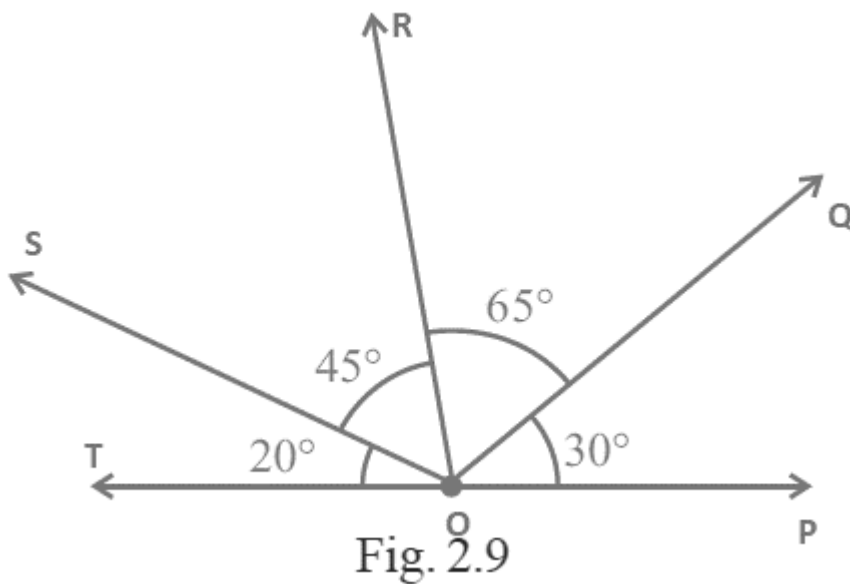
(A) 2 (B) 3 (C) 4 (D) 5



Solution

Solution:-

(c) 4



Obtuse angle is defined as an angle formed greater than 90° and less than 180° .

From the above figure,

Angle are, $\angle ROP = \angle ROQ + \angle QOP$

$$= 65^\circ + 30^\circ$$

$$= 95^\circ$$

$\angle SOP = \angle ROQ + \angle QOP + \angle SOR$

$$= 65^\circ + 30^\circ + 45^\circ$$

$$= 140^\circ$$

$\angle SOQ = \angle SOR + \angle ROQ$

$$= 45^\circ + 65^\circ$$

$$= 110^\circ$$

$\angle TOQ = \angle TOS + \angle SOR + \angle ROQ$

$$= 20^\circ + 45^\circ + 65^\circ$$

$$= 130^\circ$$

Therefore, the number of the obtuse angle formed is 4.

Question 10

The number of triangles in Fig. 2.10 is

(A) 10 (B) 12 (C) 13 (D) 14

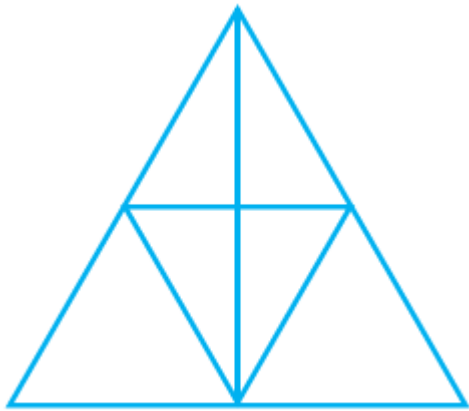
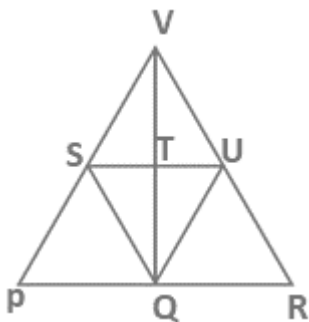


Fig. 2.10

Solution

Solution:-

(C) 13



By observing the above figure, there are 13 triangles.

$\triangle PVR$, $\triangle PSQ$, $\triangle SQU$, $\triangle SQT$, $\triangle TQU$, $\triangle QUR$, $\triangle VSU$, $\triangle VST$, $\triangle VTU$, $\triangle PQV$, $\triangle RQV$, $\triangle VSQ$, $\triangle VUQ$

Question 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

Solution: –

(D) Two right angles.

Because the sum of all angles of right angles must be equal to 180° .

Question 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

Solution:-

(D) Two right angles.

Because, the sum of all angles of right angles must be equal to 180° .

The right-angle triangle does not contain an obtuse angle.

An obtuse angle is defined as an angle formed greater than 90° and less than 180° .

Question 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

Solution:-

(B) 5

The two least consecutive prime numbers are 2 and 3

Sum of two numbers = $2 + 3 = 5$

By using formula = $n(n - 3)/2$

= $5(5 - 3)/2$

= $(5 \times 2)/2$

= $10/2$

= 5

Question 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

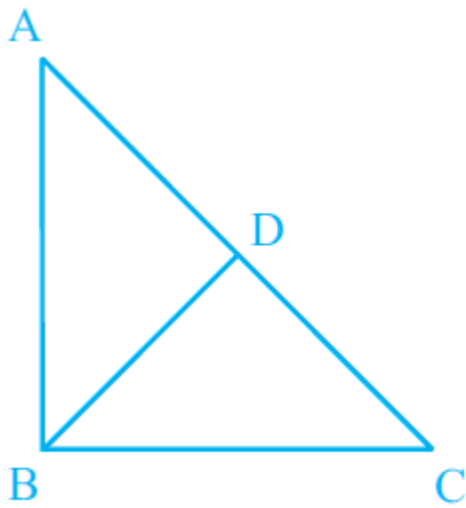


Fig. 2.11

Solution**Solution:-**

(C) 3

From the figure, $\triangle ABC$, $\triangle ABD$ and $\triangle CBD$ are isosceles triangles.

Question 15

In Fig. 2.12, $\angle BAC = 90^\circ$ and $AD \perp BC$. The number of right triangles in the figure is

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

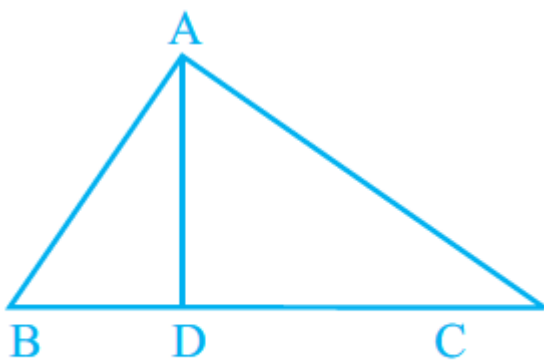


Fig. 2.12

Solution**Solution:-**

(C) 3

From the figure, $\triangle ABC$, $\triangle ABD$ and $\triangle ADC$ are right triangles.

Question 16

In Fig. 2.13, $PQ \perp RQ$, $PQ = 5$ cm and $QR = 5$ cm. Then $\triangle PQR$ 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

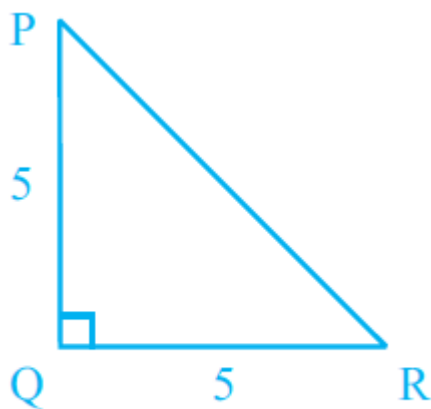


Fig. 2.13

Solution

Solution:-

- (B) an isosceles right triangle

From the question, it is given that, $PQ \perp RQ$, $PQ = 5$ cm and $QR = 5$ cm.

We know that, an isosceles triangle has two equal sides.

Therefore, the given $\triangle PQR$ is an isosceles right triangle.

In questions 17 to 31, fill in the blanks to make the statements true:

Question 17

An angle greater than 180° and less than a complete angle is called _____.

Solution

Solution:-

An angle greater than 180° and less than a complete angle is called a reflex angle.

Question 18

The number of diagonals in a hexagon is _____.

Solution

Solution:-

The number of diagonals in a hexagon is 9.

We know that a hexagon has 6 sides.

By using the formula, number of diagonals = $n(n - 3)/2$

$$= 6(6 - 3)/2$$

$$= 6(3)/2$$

$$= 18/2$$

$$= 9$$

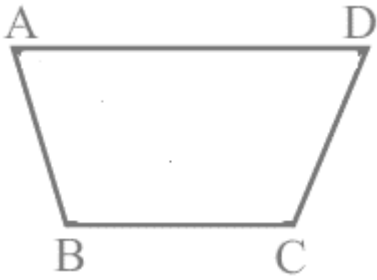
Question 19

A pair of opposite sides of a trapezium are _____.

Solution

Solution:-

A pair of opposite sides of a trapezium are parallel.



Question 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 _____.

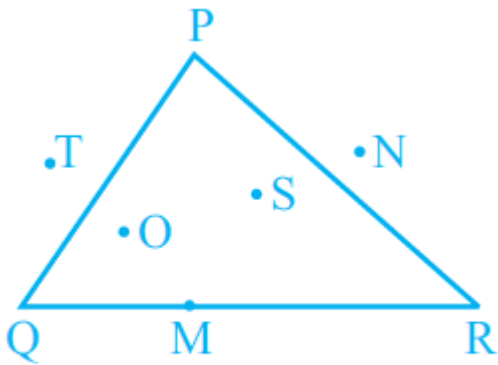


Fig. 2.14

Solution

Solution:-

In Fig. 2.14, points lying in the interior of the triangle PQR are O and S, that in the exterior are N and T and that on the triangle itself are M, P, Q and R.

Question 21

In Fig. 2.15, points A, B, C, D and E are collinear such that $AB = BC = CD = DE$. Then

- (a) $AD = AB + \underline{\hspace{2cm}}$
- (b) $AD = AC + \underline{\hspace{2cm}}$
- (c) midpoint of AE is $\underline{\hspace{2cm}}$
- (d) midpoint of CE is $\underline{\hspace{2cm}}$
- (e) $AE = \underline{\hspace{2cm}} \times AB$.



Fig. 2.15

Solution**Solution:-**

(a) $AD = AB + BD$

Where, $BD = BC + CD$

(b) $AD = AC + CD$

(c) midpoint of AE is c

(d) midpoint of CE is D

(e) $AE = 4 \times AB$. [given]

Question 22

In Fig. 2.16,

(a) $\angle AOD$ is a/an _____ angle

(b) $\angle COA$ is a/an _____ angle

(c) $\angle AOE$ is a/an _____ angle

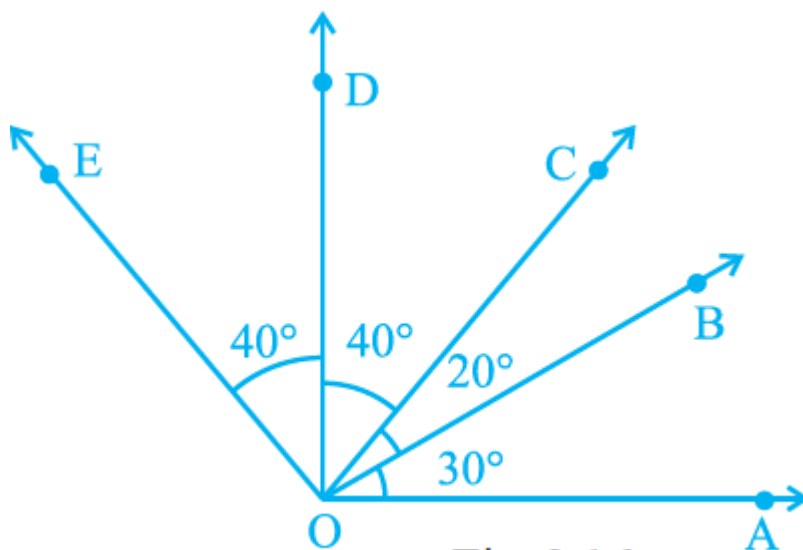


Fig. 2.16

Solution

Solution:-

From the figure,

(a) $\angle AOD$ is a/an right angle.

If any one angle in the triangle is equal to 90° , then the triangle is called a right triangle.

$$\angle AOD = \angle AOB + \angle BOC + \angle COD$$

$$= 30^\circ + 20^\circ + 40^\circ$$

$$= 90^\circ$$

(b) $\angle COA$ is a/an acute angle

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

$$\angle COA = \angle COB + \angle BOA$$

$$= 20^\circ + 30^\circ$$

$$= 50^\circ$$

(c) $\angle AOE$ is a/an obtuse angle

An obtuse angle is an angle formed between 90° to 180° .

$$\angle AOE = \angle EOD + \angle DOC + \angle COB + \angle BOA$$

$$= 40^\circ + 40^\circ + 20^\circ + 30^\circ$$

$$= 130^\circ$$

Question 23

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

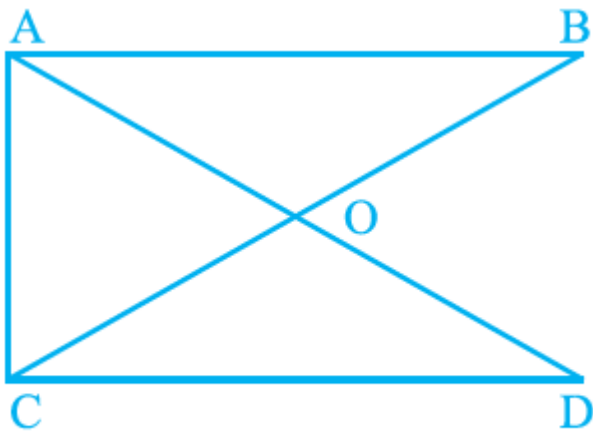


Fig. 2.17

Solution**Solution:-**

The number of triangles in Fig. 2.17 is 5. Their names are $\triangle AOC$, $\triangle COD$, $\triangle AOB$, $\triangle ACB$, $\triangle ACD$.

Question 24

Number of angles less than 180° in Fig. 2.17 is _____ and their names are .

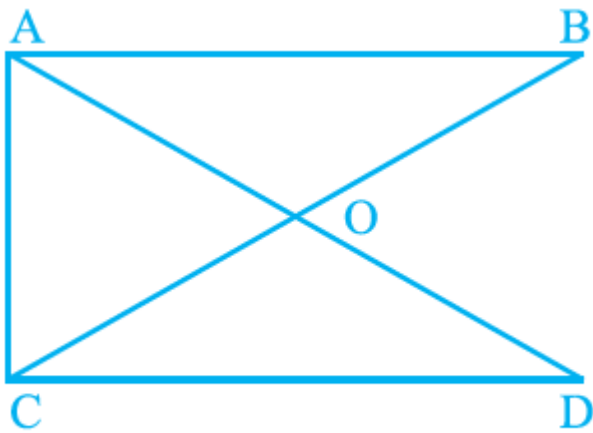


Fig. 2.17

Solution**Solution:-**

The number of angles less than 180° in Fig. 2.17 is 12, and their names are $\angle OAB$, $\angle OBA$, $\angle OAC$, $\angle OCA$, $\angle OCD$, $\angle ODC$, $\angle AOB$, $\angle AOC$, $\angle COD$, $\angle DOB$, $\angle BAC$, and $\angle ACD$.

Question 25

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

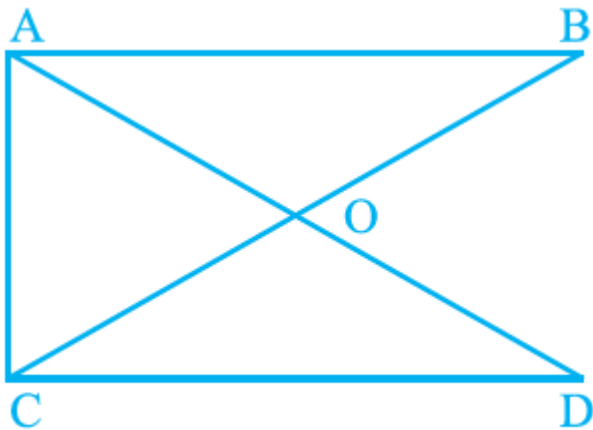


Fig. 2.17

Solution**Solution:-**

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

The angles are, $\angle AOD$, $\angle BOC$, $\angle COB$, $\angle$ and DOA .

Question 26

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

Solution**Solution:-**

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

We know that the angle formed by a straight angle = 180°

and the angle formed by right angle = 90°

So, number of right angles = $180^\circ/90^\circ = 2$

We know that complete angle = 360°

So, number of right angles = $360^\circ/90^\circ = 4$

Question 27

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

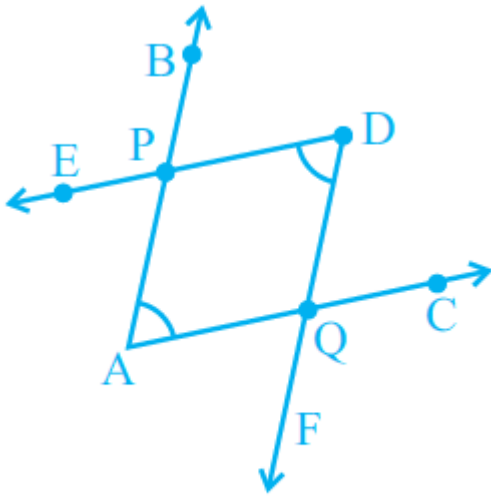


Fig. 2.18

Solution**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.

Question 28

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

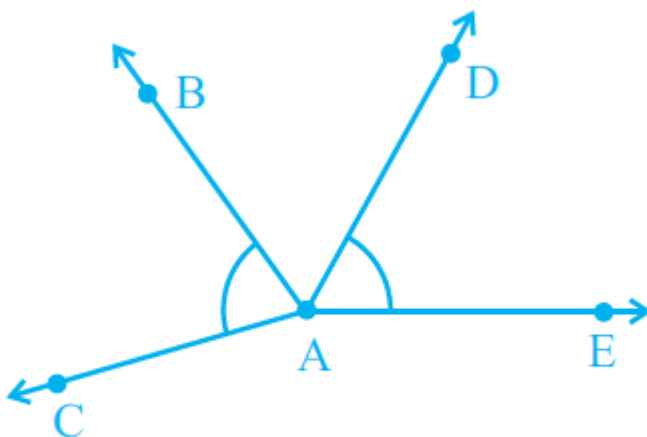


Fig. 2.19

Solution**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.

Question 29

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

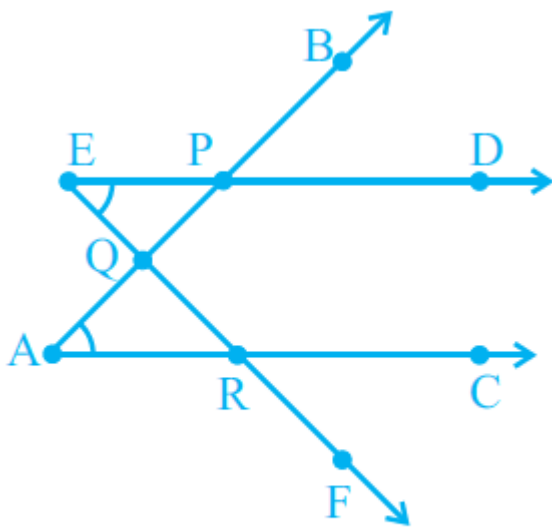


Fig. 2.20

Solution**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.

Question 30

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

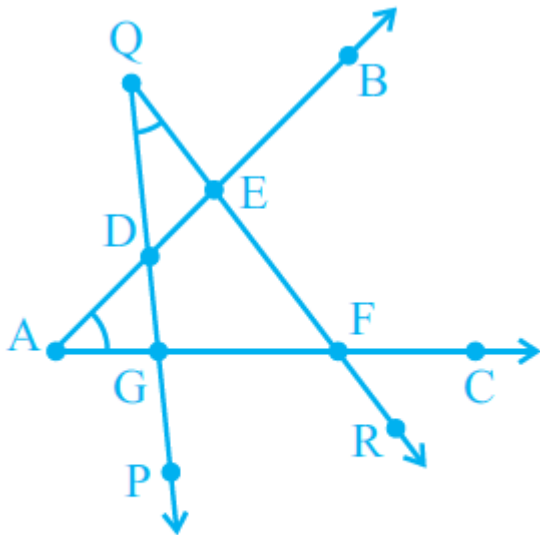


Fig. 2.21

Solution**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.

Question 31

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

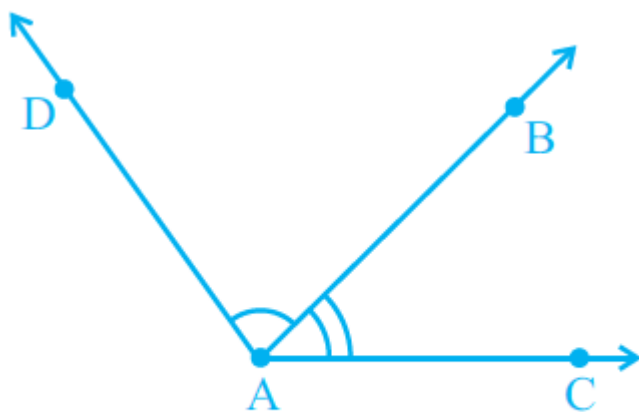


Fig. 2.22

Solution

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):

Question 32

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

Solution

Solution:-

True.

Question 33

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

Solution

Solution:-

False.

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

Question 34

If the arms of an angle on the paper are decreased, the angle decreases.

Solution

Solution:-

False.

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

Question 35

If line $PQ \parallel$ line m , then line segment $PQ \parallel m$.

Solution**Solution:-**

True.

From the question, line $PQ \parallel$ line m .

Then, parts of those lines are also parallel.

Therefore, line segment $PQ \parallel m$.

Question 36

Two parallel lines meet each other at some point.

Solution**Solution:-**

False.

Parallel lines never meet each other.

Question 37

Measures of $\angle ABC$ and $\angle CBA$ in Fig. 2.23 are the same.

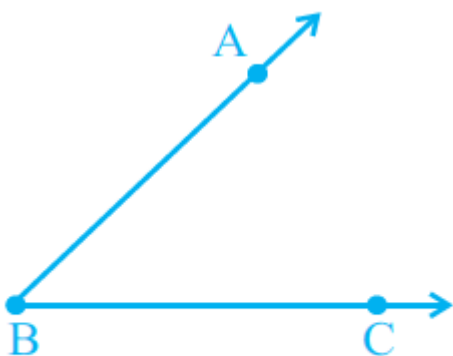


Fig. 2.23

Solution

Solution:-

True.

From the figure, both $\angle ABC$ and $\angle CBA$ contain common angle B.

Question 38

Two line segments may intersect at two points.

Solution

Solution:-

False.

Because two line segments intersect at only one point.

Question 39

Many lines can pass through two given points.

Solution

Solution:-

False.

only one line can pass through two given points.

Question 40

Only one line can pass through a given point.

Solution

Solution:-

False.

An infinite number of lines can pass through a given point.

Question 41

Two angles can have exactly five points in common.

Solution

Solution:-

False.

Two angles can have either one or two five points in common.
