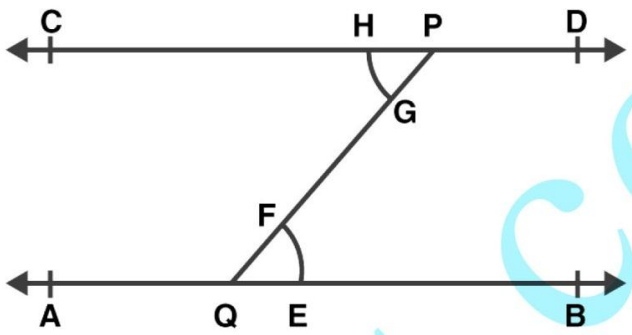
RS Aggarwal Solutions for Class 7 Maths chapter 17 Constructions

EXERCISE 17A PAGE: 204

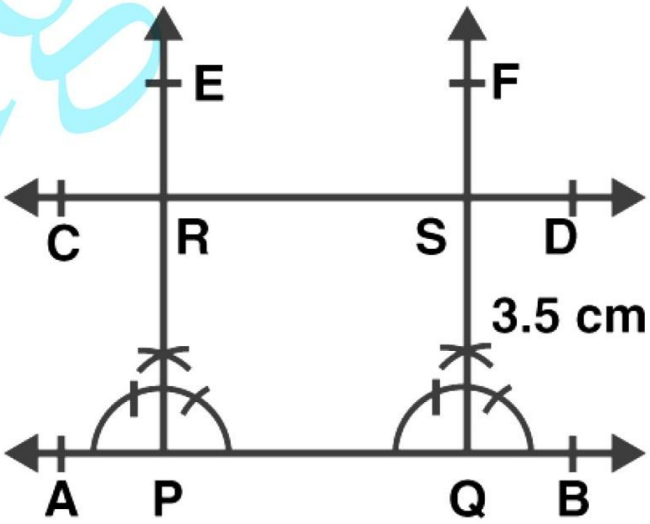
1. Draw a line AB and take a point P outside it. Draw a line CD parallel to AB and passing through the point P.
Solution:-



Steps for construction,

1. Draw a line AB.
2. Take any point Q on AB and a point P outside AB and join PQ.
3. With Q as center and any radius draw an arc to cut AB at E and PQ at F.
4. With P as center and same radius draw an arc to cut QP at G.
5. With as center and radius equal to EF, draw an arc to cut the previous arc at H.
6. Join PH and produce it on both sides to get the required line CD parallel to AB.

2. Draw a line AB and draw another line CD parallel to AB at a distance of 3.5 cm from it.
Solution:-



Steps for construction,

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1. Draw a line AB.
2. Take any two points P and Q on AB.
3. Construct $\angle BPE = 90^{o}$ and $\angle BQF = 90^{o}$.
4. With P as center and radius equal to 3.5 cm, cut PE at R.
5. With Q as center and radius equal to 3.5 cm, cut QF at S.
6. Join CD and produce it on either side to get the required line CD parallel to AB and at a distance of 3 cm from it.

EDUGROSS
WISDOMISING KNOWLEDGE

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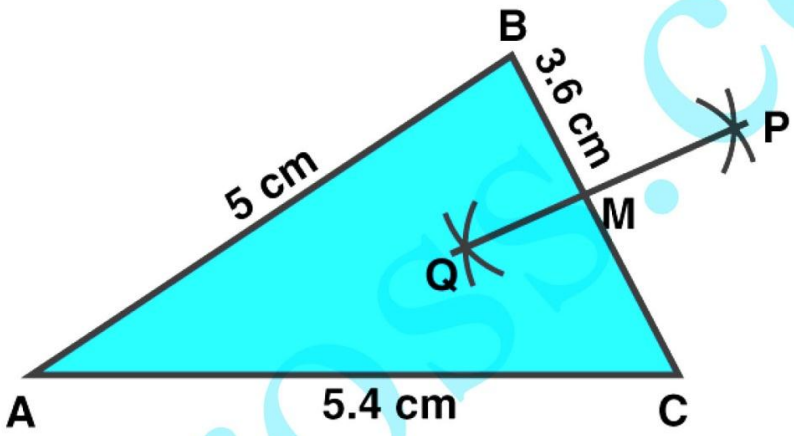
EXERCISE 17B PAGE: 207

1. Construct a ΔABC in which BC = 3.6 cm, AB = 5 cm and AC = 5.4 cm. Draw the perpendicular bisector of the side BC.
Solution:-



Steps of construction:

1. Draw a line segment AC = 5.4 cm.
2. With A as a center and radius 5 cm, draw an arc.
3. With C as a center and radius 3.6 cm, draw another arc, cutting the previous arc at B.
4. Join AB and CB.
   Then, ΔABC is the required triangle.
5. With B as center and radius measuring more than half of BC, draw arcs on both sides of BC.
6. With C as center and the same radius as before, draw arcs on both sides of BC, cutting the previous arcs at P and Q, as shown. Join PQ.
   Then, PQ is the required perpendicular bisector of BC, meeting BC at M.

2. Construct a ΔPQR in which QR = 6 cm, PQ = 4.4 cm and PR = 5.3 cm. Draw the bisector of ∠P.
Solution:-

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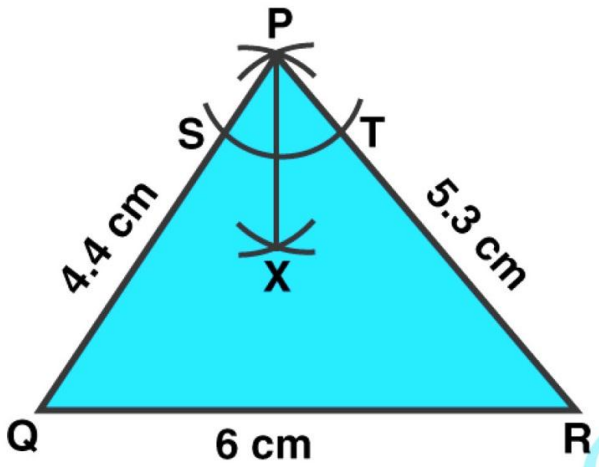
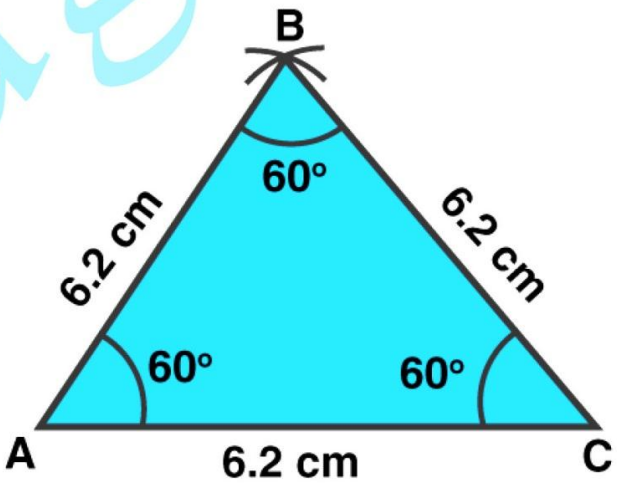


Steps of construction:

1. Draw a line segment QR = 6 cm.
2. With Q as a center and radius 4.4 cm, draw an arc.
3. With R as a center and radius 5.3 cm, draw another arc, cutting the previous arc at P.
4. Join PQ and PR.
   Then, ΔPQR is the required triangle.
5. With B as center and any radius cutting PQ and PR at S and T, respectively
6. With S as center and radius measuring more than half of ST, draw an arc.
7. With T as center and the same radius, draw another arc cutting the previous arc at x.
8. Join P and X
   Then, PX is the required bisector of ∠P.

3. Construct an equilateral triangle each of whose sides measures 6.2 cm. Measures each one of its angles.

Solution:-



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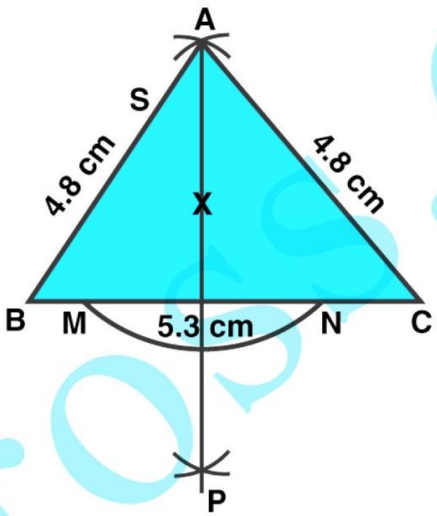
Steps of construction:

1. Draw a line segment AC = 6.2 cm.
2. With A as a center and radius 6.2 cm, draw an arc.
3. With C as a center and radius 6.2 cm, draw another arc, cutting the previous arc at B.
4. Join AB and CB.
   Then, ΔABC is the required equilateral triangle.
5. When we will measure all the angles of triangle by protractor, then all angles are equal to 60°.

4. Construct a ΔABC in which AB = AC = 4.8cm and BC = 5.3cm. Measure ∠B and ∠C. Draw AD ⊥ BC.
Solution:-



Steps of construction:

1. Draw a line segment BC = 5.3 cm.
2. With B as a center and radius 4.8 cm, draw an arc.
3. With C as a center and radius 4.8 cm, draw another arc, cutting the previous arc at A.
4. Join AB and AC.
   Then, ΔABC is the required triangle.
5. When we will measure ∠B and ∠C the angles of triangle by protractor, then the measure of angles are 56° and 56° respectively.
6. With A as the center and any radius, draw an arc cutting BC at M and N.
7. With M as the center and the radius more than half of MN, draw an arc.
8. With N as the center and the same radius, draw another arc cutting the previously drawn.
9. Join AP, cutting BC at D.
   Then, AD ⊥ BC

5. Construct a ΔABC in which AB = 3.8 cm, ∠A = 60° and AC = 5 cm.
Solution:-

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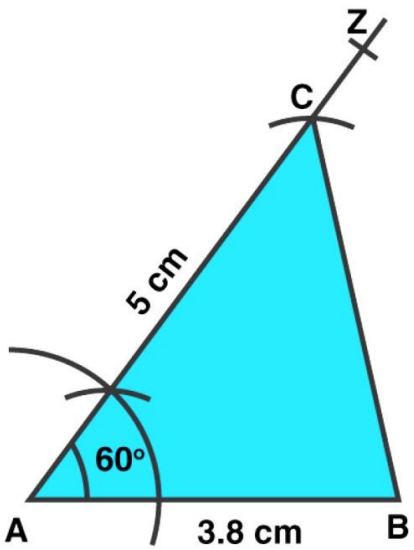


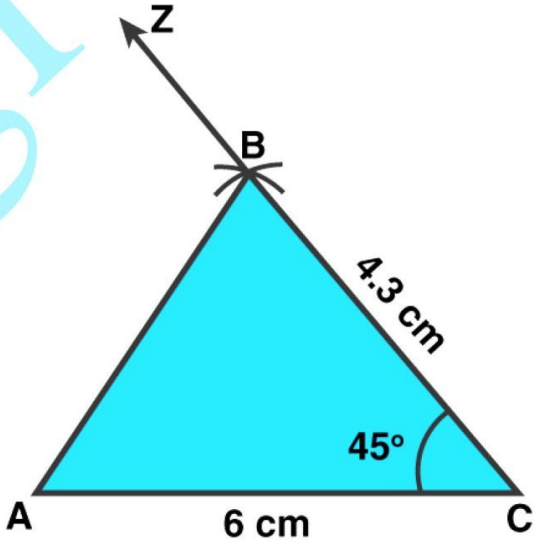
Steps of construction:

1. Draw a line segment AB = 3.8 cm.
2. Construct ∠BAZ = 60°.
3. Along AZ, set off AC = 5cm.
4. Join BC.

   Then, ΔABC is the required triangle.

6. Construct a ΔABC in which BC = 4.3 cm, ∠C = 45° and AC = 6 cm.

Solution:-



Steps of construction:

1. Draw a line segment AC = 6 cm.

2. Construct ∠ACZ = 45°.
3. Along CZ, set off BC = 4.3cm.
4. Join BC.
   Then, ΔABC is the required triangle.

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EXERCISE 17C PAGE: 208

Mark against the correct answer in each of the following:

1. The supplement of 45° is

(a) 45° (b) 75° (c) 135° (d) 155°

Solution:-

(c) 135°

Because,

Two angles are said to be supplementary if the sum of their measures is 180°.

The given angle is 45°

Let the measure of its supplement be x°.

Then,

= x + 45 = 180

= x = 180 – 45

= x = 135°

Hence, the supplement of the given angle measures 135°.

2. The complement of 80° is

(a) 100° (b) 10° (c) 20° (d) 280°

Solution:-

(b) 10°

Because,

Two angles are said to be complementary if the sum of their measures is 90°.

The given angle is 80°

Let the measure of its complement be x°.

Then,

= x + 80° = 90°

= x = 90 – 80

= x = 10°

Hence, the complement of the given angle measures 10°.

3. An angle is its own complement. The measure of the angle is

(a) 30° (b) 45° (c) 90° (d) 60°

Solution:-

(b) 45°

Because,

Let the measure of the required angle be x°. Then,

= x + x = 90°

= 2x = 90

= x = 90/2

= x = 45°

Hence, the required angle measures 45°.

4. An angle is one-fifth of its supplement. The measure of the angle is
(a) 30° (b) 15° (c) 75° (d) 150°
Solution:-
(a) 30°
Because,
Let the measure of its supplement be $x^o + (x/5)^o$.
Then,

$= x^o + (x/5)^o = 180^o$
$= x = (180 – x) / 5$
$= 5x = 180 – x$
$= 5x + x = 180$
$= 6x = 180$
$= x = 180/6$
$= x = 30^o$

Hence, the supplement of the given angle measures 30°.

5. An angle is 24° more than its complement. The measure of the angle is
(a) 47° (b) 57° (c) 53° (d) 66°
Solution:-
(b) 57°
Because,
Let the measure of its complement be $x^o + (x+24)^o$.
Then,

$= x^o + (x+24)^o = 90^o$
$= x = (90 –(x + 24))$
$= x = 90 – x + 24$
$= x + x = 114$
$= 2x = 114$
$= x = 114/2$
$= x = 57$

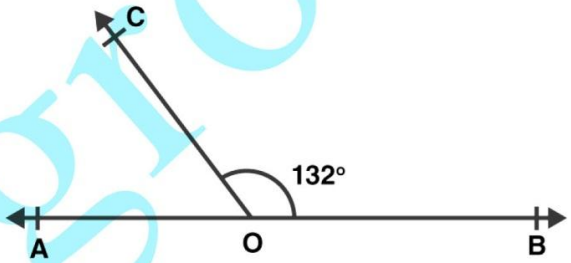
6. An angle is 32° less than its supplement. The measure of the angle is
(a) 37° (b) 74° (c) 148° (d) none of these
Solution:-
(b) 74°
Because,
Let the measure of its supplement be $x^o - (x - 32)^o$.
Then,

$= x^o - (x -32)^o = 180^o$
$= x = 180 – (x – 32)$
$= x = 180 – x - 32$
$= x + x = 148$
$= 2x = 148$

= x = 148/2
= x = 74°
Hence, the supplement of the given angle measures 74°.

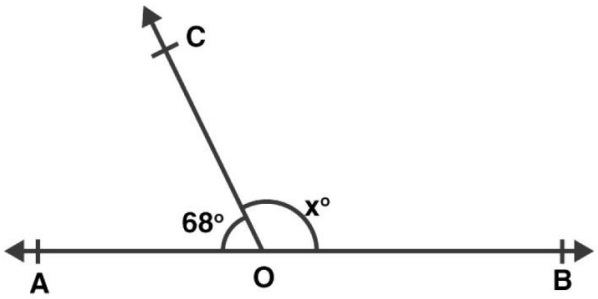
7. Two supplementary angles are in the ratio 3: 2. The smaller angle measures
(a) 108° **(b) 81°** **(c) 72°** **(d) none of these**
Solution:-
(c) 72°
Because,
Let the measure of its supplement be 3x and 2x
Then,
= 3x + 2x = 180
= 5x = 180
= x = 180/5
= x = 36°
Hence, the smaller angle measures 2x = (2 × 36) = 72°

8. In the given figure, AOB is a straight line and the ray OC stands on it. If ∠BOC = 132°, then ∠AOC =?
(a) 68° **(b) 48°** **(c) 42°** **(d) none of these**



Solution:-
(b) 48°
Because,
∠AOC =?
= ∠AOC + ∠BOC = 180° … [∵ Linear pair]
= ∠AOC + 132° = 180°
= ∠AOC = 180 – 132
= ∠AOC = 48°

9. In the given figure, AOB is a straight line, ∠AOC = 68° and ∠BOC =x°.
(a) 32 **(b) 22** **(c) 112** **(d) 132**



Solution:-

(c) 112

Because,

= ∠BOC + ∠AOC = 180° … [∵ Linear pair]

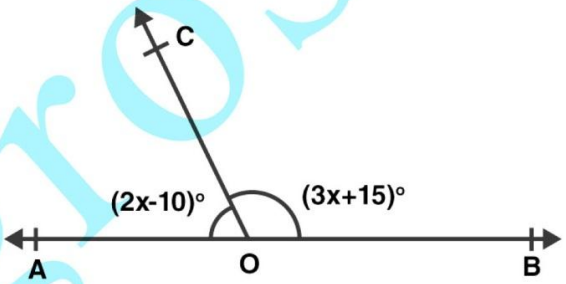
= $x^O + 68^O = 180^o$

= $x^O = 180 – 68$

= $x^O = 112$

10. In the adjoining figure, what value of x will make AOB a straight line?

(a) x = 30 (b) x = 35 (c) x = 25 (d) x = 40



Solution:-

(b) x = 35

Because,

It is given that the angles of the side be $(2x – 10)^o$ and $(3x + 15)^o$.

= (2x – 10) + (3x + 15) = 180 … [∵ Linear pair]

= 2x – 10 + 3x + 15 = 180

= 5x + 5 = 180

= 5x = 180 - 5

= 5x = 175

= x = 175/5

= x = 35

11. In the given figure, what value of x will make AOB a straight line?

(a) x = 50 (b) x = 100 (c) x = 60 (d) x = 80

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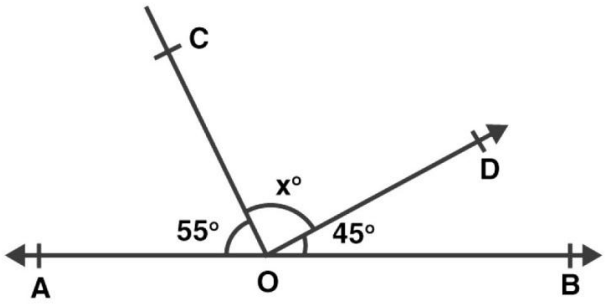


Solution:-

(d) x = 80

Because,

It is given that the angles of the side be 55°, 45° and (x)°.

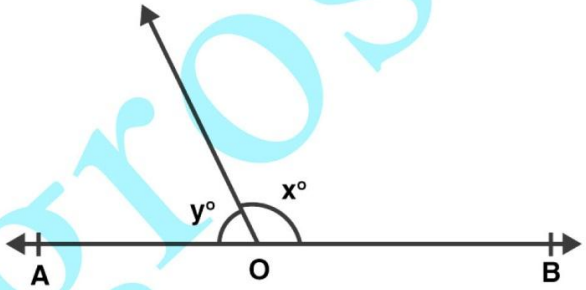
= x + 55° + 45° = 180° ... [∵ Linear pair]

= x = 180 – 100

= x = 80

12. In the given figure, it is given that AOB is a straight line and 4x = 5y. What is the value of x?

(a) 100 (b) 105 (c) 110 (d) 115



Solution:-

(a) 100

Because,

Let the measure of its supplement be 4x and 5y.

Then,

= x + (4/5)x = 180°

= (5x + 4x)/5 = 180

= 9x = 180 × 5

= 9x = 900

= x = 900/9

= x = 100

13. In the given figure, two straight lines AB and CD intersect at a point O and ∠AOC = 50°. Then ∠BOD =?

(a) 40° (b) 50° (c) 130° (d) 60°

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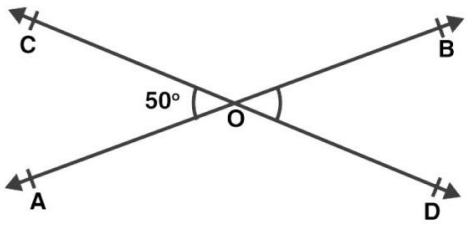


Solution:-

(c) 130°

Because,

= ∠AOC + ∠BOD = 180° … [∵ Linear pair]

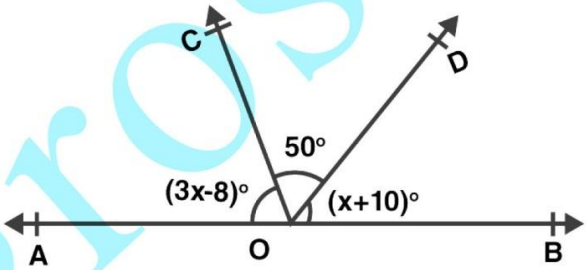
= 50° + ∠BOD = 180°

= ∠BOD = 180 – 50

= ∠BOD = 130°

14. In the given figure, AOB is a straight line, ∠AOC = (3x – 8)°, ∠AOC = 50° and ∠BOD = (x + 10)°. The value of x is

(a) 32 (b) 42 (c) 36 (d) 52



Solution:-

(a) 32

Because,

It is given that the angles of the side be (3x – 8)°, 50° and (x + 10)°.

= (3x – 8) + 50° + (x + 10) = 180 … [∵ Linear pair]

= 3x – 8 + 50 + x + 10 = 180

= 4x + 52 = 180

= 4x = 180 - 52

= 4x = 128

= x = 128/4

= x = 32

15. In ΔABC, side BC has produced to D. If ∠ACD = 132° and ∠A = 54°, then ∠B =?

(a) 48° (b) 78° (c) 68° (d) 58°

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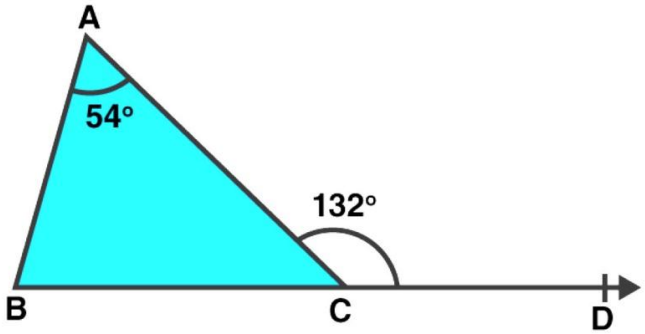


Solution:-

(b) 78°

Because,

Consider the ΔABC,

We know that the exterior angle of a triangle is equal to the sum of its interior opposite angles.

∴ ∠ABC + ∠BAC = ∠ACD

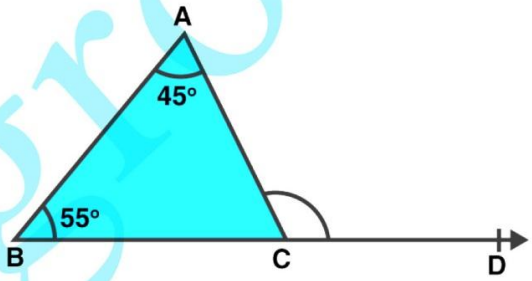
= ∠ABC + 54° = 132°

= ∠ABC = 132° – 54°

= ∠ABC = 78°

16. In ΔABC, side BC has been produced to D. if ∠BAC = 45° and ∠ABC = 55°, then ∠ACD =?

(a) 80° **(b) 90°** **(c) 100°** **(d) 110°**



Solution:-

(c) 100°

Because,

We know that the exterior angle of a triangle is equal to the sum of its interior opposite angles.

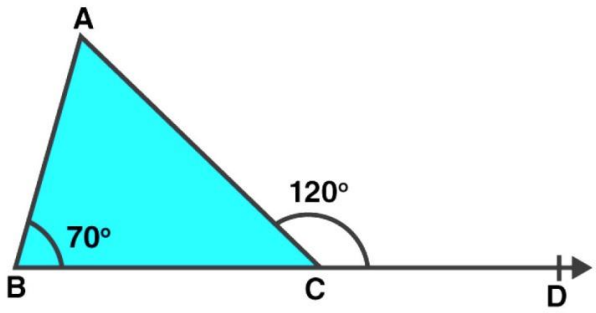
∴ ∠ABC + ∠BAC = ∠ACD

= 55° + 45° = ∠ACD

= ∠ACD = 100°

17. In the given figure, side BC of ΔABC is produced to D such that ∠ABC = 70° and ∠ACD = 120°. Then, ∠BAC =?

(a) 60° **(b) 50°** **(c) 70°** **(d) 35°**



Solution:-

(b) 50°

Because,

We know that the exterior angle of a triangle is equal to the sum of its interior opposite angles.

∴ ∠ABC + ∠BAC = ∠ACD

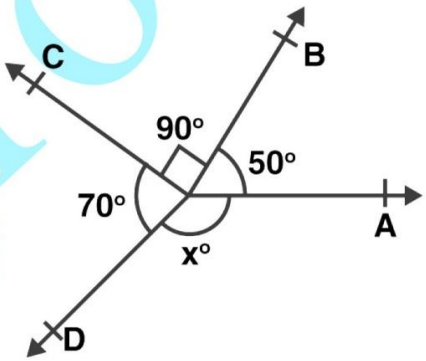
= 70° +∠BAC = 120°

= ∠BAC = 120° – 70°

= ∠BAC = 50°

18. In the given figure, rays OA, OB, OC and OD are such that ∠AOB = 50°, ∠BOC = 90°, ∠COD = 70° and ∠AOD = x°.

(a) 50° **(b) 70°** **(c) 150°** **(d) 90°**



Solution:-

(c) 150°

Because,

We know that the complete angle is equal to the sum of all angles is equal to 360°.

∴ ∠AOB + ∠BOC + ∠COD + ∠AOD = 360°

= 50° + 90° + 70° + x° = 360°

= x° + 210° = 360°

= x° = 360° – 210°

= x° = 150°

19. In the given figure, ∠A = 50°, CE ‖ BA and ∠ECD = 60°. Then, ∠ACB =?

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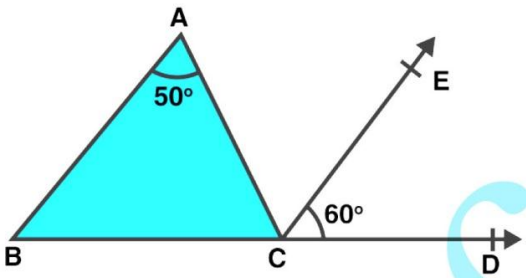
(a) 50° **(b) 60°** **(c) 70°** **(d) 80°**



Solution:-

(c) 70°

Because,

Here,

= ∠ACE = ∠BAC = 50° [Alternate angles]

= ∠ACB + ∠ACE + ∠DCE = 180° [Linear pair]

= ∠ACB = 180° – (50° + 60°)

= ∠ACB = 180^0 – 110°

= ∠ACB = 70°