KD EDUCATION ACADEMY [9582701166]

Time : 6 hour | STD 9 Maths | Total Marks : 270

kd 90+ questions ch-8 Quadrilateral

*** Choose the right answer from the given options. [1 Marks Each] [71]**

1. If the diagonals of a quadrilateral bisect each other at right angles then the figure is a:

(A) Parallelogram (B) Rhombus (C) Trapezium (D) Rectangle

Ans. :

b. Rhombus

Solution:

Rhombus is the correct answer. As we know that from all the quadrilaterals given in other options the diagonals of rhombus bisect each other at right angles.

2. In Quadrilateral ABCD, $\angle A = (3x)^\circ,\ \angle B = (5x)^\circ,\ \angle C = (20x)^\circ,\ \angle D = (8x)^\circ$. Find the value of x?

(A) 11 (B) 10 (C) 20 (D) 9

Ans. :

b. 10

Solution:

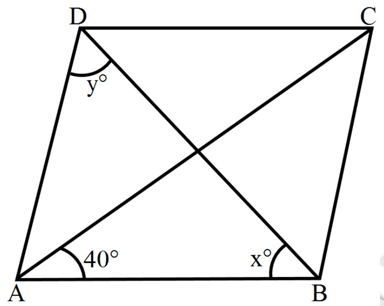
$\angle A + \angle B + \angle C + \angle D = 360$ (angle sum property)

3x + 5x + 20x + 8x = 360

36x = 360

x = 10

3. In the given figure, ABCD is a Rhombus. Find the value of x and y?



(A) x = 55º and y = 65º (B) x = 50º and y = 50º (C) x = 75º and y = 55º (D) x = 80º and y = 80º

Ans. :

b. x = 50º and y = 50º

Solution:

ABCD is a rhombus and a rhombus is also a parallelogram. A rhombus has four equal sides.

The diagonals of a rhombus are perpendicular bisector of each other.

So, in $\triangle AOB,\ \angle OAB = 40^\circ, \angle AOB = 90^\circ$ and

$\angle ABO = 180^\circ - (40^\circ + 90^\circ) = 50^\circ$

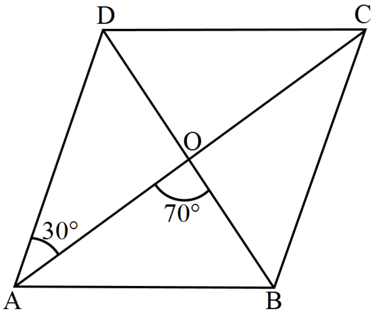
$\therefore x = 50^\circ$

In $\triangle ABD$, $AB = AD$

So, $\angle ABD = \angle ADB = 50^\circ$

Hence, x = 50° and y = 50°

4. The Diagonals AC and BD of a Parallelogram ABCD intersect each other at the point O such that $\angle DAC = 30^\circ$ and $\angle AOB = 30^\circ$. Then, $\angle DBC$?



(A) 30º (B) 45º (C) 35º (D) 40º

Ans. :

d. 40º

Solution:

$\angle DAC = \angle ACB = 30^\circ$ (alternate angles)

$\angle BOA = \angle BOC = 180^\circ$ (linear pair)

$\angle BOC = 180^\circ - 70^\circ = 110^\circ$

In $\triangle BOC,\ \angle BOC + \angle OCB + \angle CBO = 180^\circ$ (angle sum property)

$110^\circ + 30^\circ + \angle CBO = 180^\circ$

$\angle CBO = 180^\circ - 140^\circ = 40^\circ = \angle DBC$

5. PQRS is a quadrilateral. PR and QS intersect each other at O. in which of the following cases, PQRS is a parallelogram?

(A) $\angle P = 100^\circ, \angle Q = 80^\circ, \angle R = 100^\circ$

(B) $\angle P = 85^\circ, \angle Q = 85^\circ, \angle R = 95^\circ$

(C) $PQ = 7cm, QR = 7cm, RS = 8cm, SP = 8cm$

(D) $OP = 6.5cm, OQ = 6.5cm, OR = 5.2cm, OS = 5.2cm$

Ans. :

a. $\angle P = 100^\circ, \angle Q = 80^\circ, \angle R = 100^\circ$

Solution:

In a parallelogram, opposite corner angles are equal and sum of adjacent angles = 108°

Hence, in quadrrilateral PQRS,

$\Rightarrow \angle P = \angle R$ and $\angle Q = \angle S$

Also, $\angle P + \angle Q = \angle Q + R = 180^\circ$

Hence, if $\angle P = 100^\circ$ and $\angle Q = 80^\circ$, then

$\angle P + \angle Q = 100^\circ + 80^\circ = 180^\circ$

Also, if $\angle Q + = 80^\circ$ and $\angle R = 100^\circ$ then

$\angle Q + \angle R = 80^\circ + 100^\circ = 180^\circ$

6.

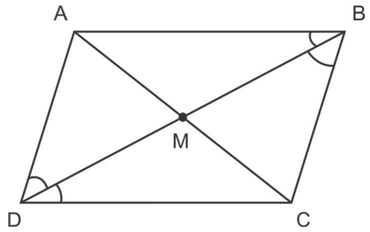
ABCD is a parallelogram, M is the mid-point of BD and BM bisects $\angle B$. Then, $\angle AMB =$

(A) 45° (B) 60° (C) 90° (D) 75°

Ans. :

c. 90°

Solution:



$\angle ABM = \angle CBM \ldots (1)$ (BM bisects $\angle B$)

$\angle ABM = \angle MDC \ldots (2)$ (Alternate angles)

$\angle CBM = \angle ADM \ldots (3)$ (Alternate angles)

From equations (1), (2) & (3)

$\angle MDC = \angle ADM \ldots (4)$

Now, consider $\triangle ABM$ & $\triangle CBD$

$\angle CBD = \angle ABD$ {from eq (1)}

DB = DB (Common)

$\angle ADB = \angle CDB$ {from eq (4)}

Hence, by ASA property,

$\triangle ADB \cong \triangle CBD$

⇒ AB = CB, AD = CD

Hence, it becomes a Rhombus.

So now diagonals of a Rhombus bisect each other at 90°.

$\Rightarrow \angle AMB = 90^\circ$

7. The Diagonals AC and BO of a Parallelogram ABCD intersect each other at point 0. If $\angle DAC = 32^\circ$ and $\angle AOB = 70^\circ$, then $\angle DBC$ is equal to:

(A) 86º (B) 38º (C) 32º (D) 24º

Ans. :

b. 38º

Solution:

$\angle OAC = \angle ACB = 32^\circ$ (alternate angles)

$\angle AOB = \angle COB = 180^\circ$ (linear pair)

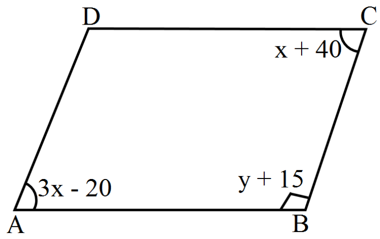
$\angle COB = 180 - 70 = 110^\circ$

In $\triangle BOC,\ \angle BOC + \angle OCB + \angle CBO = 180^\circ$ (angle sum property)

$110 + 32 + \angle CBO = 180^\circ$

$\angle CBO = 180 - 142 = 38^\circ$

8. In a parallelogram ABCD if $\angle A = (3x - 20),\ \angle B = (Y + 15),\ \angle C = (x + 40)$ then find the value of x and y?



(A) x = 30º and y = 65º

(B) x = 30º and y = 95º

(C) x = 32º and y = 95º

(D) x = 38º and y = 85º

Ans. :

b. x = 30º and y = 95º

Solution:

Given, ABCD is a parallelogram.

So,

$\angle \mathrm{A}=\angle \mathrm{C}$ (Opposite angles of parallelogram are equal in size)

⇒ 3x - 20 = x + 40

⇒ 3x - x = 40 + 20

⇒ 2x = 60

⇒ x = 30º

Thus, $\angle \mathrm{A}=3 \times 30-20=90-20=70^{\circ}$

Now, $\angle \mathrm{A}+\angle \mathrm{B}=180^{\circ}$ (Sum of interior angles of parallelogram is 180°)

$\Rightarrow 70^{\circ}+\angle \mathrm{B}=180^{\circ}$

$\Rightarrow \angle \mathrm{B}=180^{\circ}-70^{\circ}$

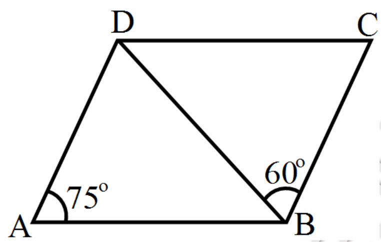
$\Rightarrow \angle \mathrm{B}=110^{\circ}$

⇒ y + 15 = 110º

⇒ y = 95º

Hence, x = 30º and y = 95º

9. In the given figure, ABCD is a parallelogram in which $\angle \mathrm{BAD}=75^{\circ}$ and $\angle \mathrm{CBD}=60^{\circ}$. Then, $\angle \mathrm{BDC}=?$



(A) 60°

(B) 75°

(C) 45°

(D) 50°

Ans. :

c. 45°

Solution:

We know that, the opposite angles of a parallelogram are equal.

$\therefore \angle \mathrm{C}=\angle \mathrm{A}=75^{\circ}$

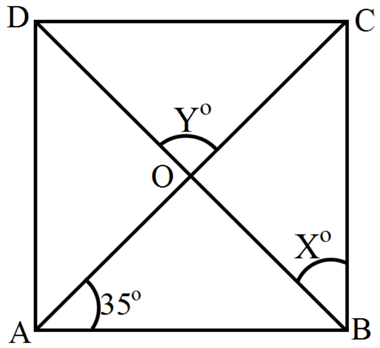
In $\triangle \mathrm{BCD}$,

$\angle \mathrm{BCD}+\angle \mathrm{BDC}+\angle \mathrm{CBD}=180^{\circ}$ ...(Angle sum property)

$\Rightarrow 75^{\circ}+\angle \mathrm{BDC}+60^{\circ}=180^{\circ}$

$\Rightarrow \angle BDC = 45^\circ$

10. In the figure, ABCD is a Rectangle. Find the values of x and y?



(A) x = 55º and y = 110º (B) x = 100º and y = 100º (C) x = 50º and y = 100º (D) x = 60º and y = 120º

Ans. :

a. x = 55º and y = 110º

Solution:

ABCO is a rectangle The diagonals of a rectangle are congruent and bisect each other. Therefore, in

$\triangle AOB$, we have:

OA = OB

$\angle OAB = \angle OBA = 35^\circ$

$x = 90^\circ - 35^\circ = 55^\circ$ and $\angle AOB = 180^\circ - (35^\circ + 35^\circ) = 110^\circ$

$y = \angle AOB = 110^\circ$ [Vertically opposite angles]

Hence, x = 55° and y = 110°

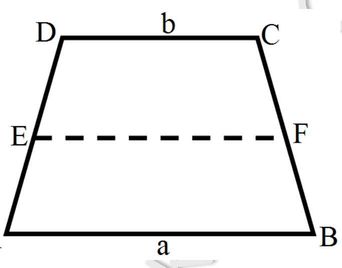
11. The parallel sides of a trapezium are a and b respectively. The line joining the mid-points of its non-parallel sides will be:

(A) $\frac{1}{2}(a-b)$ (B) $\frac{1}{2}(a+b)$ (C) $\frac{2ab}{(a+b)}$ (D) $\sqrt{ab}$

Ans. :

b. $\frac{1}{2}(a+b)$

Solution:



E and F are the given to be the mid-points of AD and BC respectively.

$\therefore EF = \frac{1}{2}(AB + DC)$

$= \frac{1}{2}(a+b)$

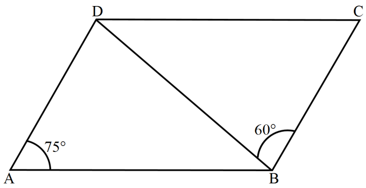
12. In a parallelogram ABCD, if $DAB = 75^\circ$ and $\angle DBC = 60^\circ$, then $\angle BDC = \ ?$

(A) 50º (B) 45º (C) 65º (D) 75º

Ans. :

b. 45º

Solution:



We know that the opposite angles of a parallelogram are equal.

Therefore, $\angle \mathrm{BCD}=\angle \mathrm{BAD}=75^{\circ} \ldots$ (i)

(i) Now, in $\triangle \mathrm{BCD}$,

We have,

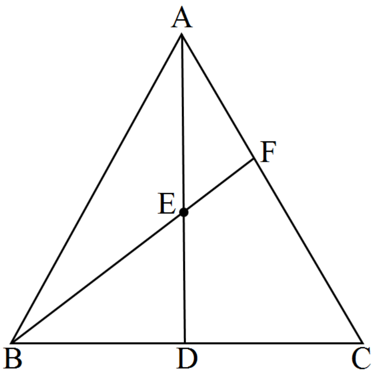
$\angle \mathrm{CDB}+\angle \mathrm{DBC}+\angle \mathrm{BCD}=180^{\circ}$ [Since, sum of the angles of a triangle is 180º]

$\Rightarrow \angle \mathrm{CDB}+60^{\circ}+75^{\circ}=180^{\circ}$

$\Rightarrow \angle \mathrm{CDB}+135^{\circ}=180^{\circ}$

$\Rightarrow \angle \mathrm{CDB}=\left(180^{\circ}-135^{\circ}\right)=45^{\circ}$

13. In the given figure, AD is a median of $\triangle \mathrm{ABC}$ and E is the midpoint of AD. If BE is joined and produced to meet AC in F then AF = ?



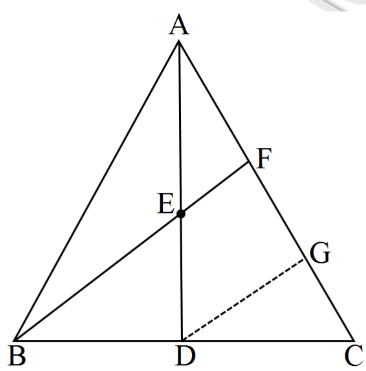
(A) $\frac{1}{3} \mathrm{AC}$ (B) $\frac{3}{4} \mathrm{AC}$ (C) $\frac{1}{2} \mathrm{AC}$ (D) $\frac{2}{3} \mathrm{AC}$

Ans. :

a. $\frac{1}{3} \mathrm{AC}$

Solution:

Let G be the mid-point of FC and join DG.



In $\triangle \mathrm{BCF}$,

G is the mid-point of FC and D is the mid-point of BC.

Thus, $\mathrm{DG} \| \mathrm{BF}$

$\mathrm{DG} \| \mathrm{EF}$

Now, In $\triangle BDG$,

E is the mid-point of AD and EF is parallel to DG.

Thus, F is the mid-point of AG.

AF = FG = GC [G is the mid-point of FC]

Hence, $AF = \frac{1}{3}AC$

14. The area of a quadrilateral whose diagonals measure 48m and 32m respectively and bisect each other at right angles is:

(A) $742m^2$ (B) $732m^2$ (C) $758m^2$ (D) $768m^2$

Ans. :

d. $768m^2$

Solution:

According to the question,

$\text{Area of given quadrilateral} = \frac{1}{2} \times \text{Product of diagonals}$

$= \frac{1}{2} \times 48 \times 32$

$= 768m^2$

15. In a quadrilateral ABCD, $\angle A + \angle C$ is 2 times $\angle B + \angle D$ If $\angle A = 140^\circ$ and $\angle D = 60^\circ$ then $\angle B =$

(A) 60° (B) 80° (C) 120° (D) None of these.

Ans. :

a. 60°

Solution:

$\angle A + \angle B + \angle C + \angle D = 360^\circ \ldots(1)$

Now, $\angle A + \angle C = 2(\angle B + \angle D)$ (given) ...(2)

Also, $\angle A = 140^\circ,\ \angle D = 60^\circ$

Putting value of $(\angle A + \angle C)$ from eq. (2) in eq. (1)

$2(\angle B + \angle D) + \angle B + \angle D = 360^\circ$

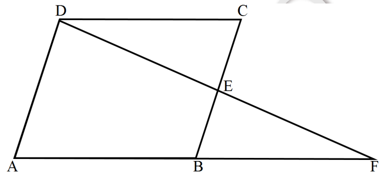
$3(\angle B + \angle D) = 360^\circ$

$\Rightarrow \angle B + \angle D = 120^\circ$

$\Rightarrow \angle B + 60^\circ = 120^\circ$

$\Rightarrow \angle B = 60^\circ$

16. In given figure, ABCD is a parallelogram and E is the mid-point of BC. DE and AB when produced meet at F. Then, AF = ?



(A) AF = 2AB (B) $AF = \frac{3}{2}AB$ (C) AF = 3AB (D) $AF^2 = 2AB^2$

Ans. :

a. AF = 2AB

Solution:

By the congruency of triangles,

BEF and CED (AAS Rule) are congruent

So, DC = BF (CPCT) ...(1)

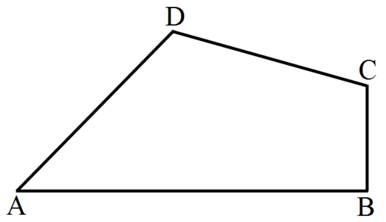
But DC = AB ...(2)

So, AB = BF

but AF = AB + BF

So, AF = 2AB

17. In Quadrilateral ABCD, $\angle A + \angle C = 140^\circ,\ \angle A : \angle C = 1 : 3$ and $\angle B : \angle D = 5 : 6$. Find the values of $\angle A,\ \angle B,\ \angle C$ and $\angle D$?



(A) 10º, 20º, 100º, 260º

(B) 35º, 100º, 105º, 120º

(C) 100º, 102º, 120º, 10º

(D) 90º, 90º, 100º, 80º

Ans. :

b. 35º, 100º, 105º, 120º

Solution:

given: $\angle A + \angle C = 140^\circ$

and $\angle A : \angle C = 1 : 3$

and $\angle B : \angle D = 5 : 6$

$\Rightarrow \angle A = \frac{1}{4} \times 140^\circ - 35^\circ$

$\Rightarrow \angle C = \frac{3}{4} \times 140^\circ - 105^\circ$

Now according to angle sum property of quadrilateral

$\angle A + \angle B + \angle C + \angle D = 360^\circ$

$\Rightarrow 35^\circ + \angle B + 105^\circ + \angle D = 360^\circ$

$\Rightarrow \angle B + \angle D = 360^\circ - 140^\circ = 220^\circ$

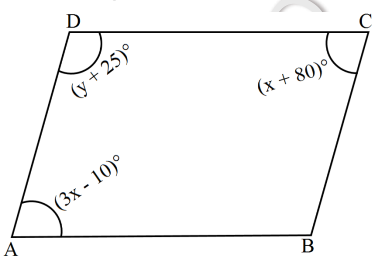
$\Rightarrow 5x + 6x = 220^\circ$

$\Rightarrow x = 20^\circ$

So, $\angle B = 5 \times 20^\circ = 100^\circ$

and $\angle D = 6 \times 20^\circ = 120^\circ$

18. In the fig, ABCD is a Parallelogram. The values of x and y are:



(A) 55º, 35º

(B) 45º, 45º

(C) 30º, 35º

(D) 45º, 30º

Ans. :

d. 45º, 30º

Solution:

3x - 10º = x + 80º [opposite angles of a parallelogram are equal]

3x - x = 80º + 10º

2x = 90º

$\mathrm{x}=\frac{90^{\circ}}{2}$

x = 45º

3x - 10º + y + 25º = 180º [In a parallelogram co-interior angles are supplementary]

3 × 45º - 10º + y + 25º = 180º

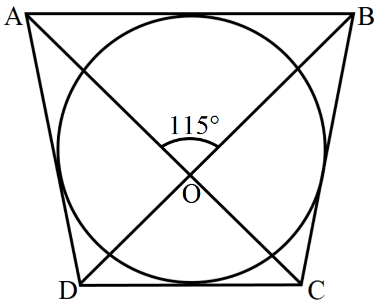
135º + 25º - 10º + y = 180º

150º + y = 180º

y = 180º - 150º

y = 30º

19. In Fig. the quadrilateral ABCD circumscribes a circle with centre O. If $\angle \mathrm{AOB}=115^{\circ}$, then find $\angle \mathrm{COD}=\ ?$



(A) 127º (B) 115º (C) 23º (D) 24º

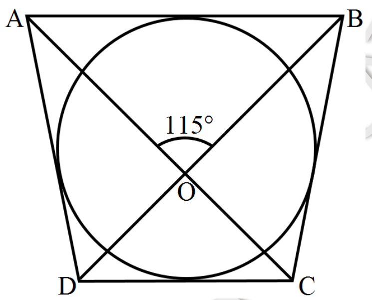
Ans. :

b. 115º

Solution:

$\because \angle \mathrm{AOB}=\angle \mathrm{COD}$ (vertically opposite angle)

$\therefore \angle \mathrm{COD}=115^{\circ}$



20. If an angle of a parallelogram is two-third of its adjacent angle, the smallest angle of the parallelogram is:

(A) 108° (B) 54° (C) 72° (D) 81°

Ans. :

c. 72°

Solution:

Let one of the angle of the || gm be x°.

According to the given condition,

$\therefore$ the adjacent angle $= \frac{2}{3}x^\circ$

Now,

$x + \frac{2}{3}x = 180^\circ$ ...(Sum of the adjacent angles of || gm is 180°.)

$\Rightarrow \frac{3x+2x}{3} = 180^\circ$

$\Rightarrow \frac{5x}{3} = 180^\circ$

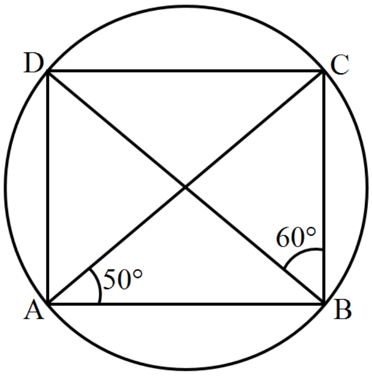
$\Rightarrow 5x = 540^\circ$

$\Rightarrow x = 108^\circ$

⇒ the adjacent angles $= \frac{2}{3}(108) = 36 \times 2 = 72^\circ$

Hence, the smallest angle is 72°.

21. In Fig. ABCD is a cyclic quadrilateral. If $\angle BAC = 50^\circ$ and $\angle DBC = 60^\circ$ then find $\angle BCD = \ ?$



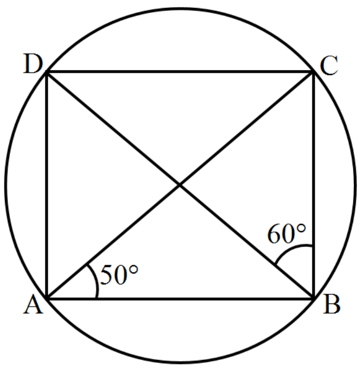
(A) 50º (B) 55º (C) 60º (D) 70º

Ans. :

d. 70º

Solution:

Here, $\angle BAC = 50^\circ$ (angles in same segment are equal)



In $\triangle BCD$, we have

$\angle BCD = 180^\circ - (\angle BDC + \angle DBC)$

$= 180^\circ - (50^\circ + 60^\circ)$

$= 70^\circ$

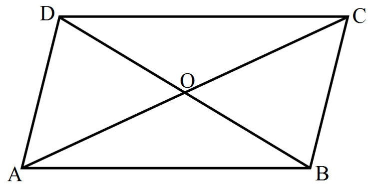
22. The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle DAC = 32^\circ$ and $\angle AOB = 70^\circ$ then, $\angle DBC$ is equal to:

(A) 24º (B) 86º (C) 38º (D) 40º

Ans. :

c. 38º

Solution:



Let ABCD is the parallelogram, in which AC and BD are diagonals that intersect at O.

We have, $\angle DAC = 32°$; $\angle AOB = 70°$ [given]

Since ABCD is a ||gm, so $AB \parallel CD$ and $AD \parallel BC$.

Since $AD \parallel BC$, and AC is a transversal,

Then $\angle ACB = \angle DAC$ [alternate interior angles]

So, $\angle ACB = 32° \Rightarrow \angle OCB = 32°$

Since, $\angle AOB$ and $\angle OBC$ form a linear pair, then $\angle AOB + \angle BOC = 180°$

$\Rightarrow 70° + \angle BOC = 180° \Rightarrow \angle BOC = 180° - 70° \Rightarrow \angle BOC = 110°$

In $\angle OBC$,

We have, $\angle BOC + \angle OCB + \angle OBC = 180°$ [angle sum property]

$\Rightarrow 110° + 32° + \angle OBC = 180°$

$\Rightarrow 142° + \angle OBC = 180°$

$\Rightarrow \angle OBC = 180° - 142°$

$\Rightarrow \angle OBC = 38°$

$\Rightarrow \angle DBC = 38°$

23. If the diagonals of a quadrilateral bisect each other at right angles, then the figure is a:

(A) Trapezium. (B) Parallelogram. (C) Rectangle. (D) Rhombus.

Ans. :

d. Rhombus.

Solution:

If the diagonals of a quadrilateral bisect each other at right angles,

then the figure is a rhombus.

This is because in a rhombus, the diagonals are perpendicular bisectors of each other.

24. Two parallelograms stand on equal bases and between the same parallels. The ratio of their areas is:

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

Ans. :

d. 1 : 1

Solution:

Area of a parallelogram = base × height

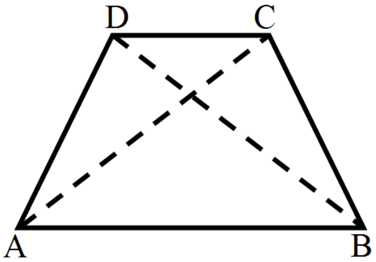
Since two parallelogram stand on equal bases and between the same parallel lines,

their heights are same.

$\therefore$ Areas are also same.

$\therefore$ The ratio of their area is 1 : 1.

25. In a trapezium ABCD, if AB || CD, then ($AC^2 + BD^2$) = ?



(A) $BC^2 + AD^2 + 2BC \cdot AD$

(B) $AB^2 + CD^2 + 2AB \cdot CD$

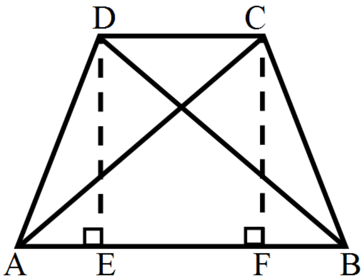
(C) $AB^2 + CD^2 + 2AD \cdot BC$

(D) $BC^2 + AD^2 + 2AB \cdot CD$

Ans. :

d. $BC^2 + AD^2 + 2AB \cdot CD$

Solution:



Construction: Draw perpendicular from D and C on AB which meets AB at E and F, respectively.

So, DEFC is a parallelogram, since one pair of opposite sides are parallel and equal.

In $\triangle ABC$,

$\angle B$ is an acute angle.

$\Rightarrow AC^2 = BC^2 + AB^2 - 2AB \times AE$

In $\triangle ABD$,

$\angle A$ is an acute angle.

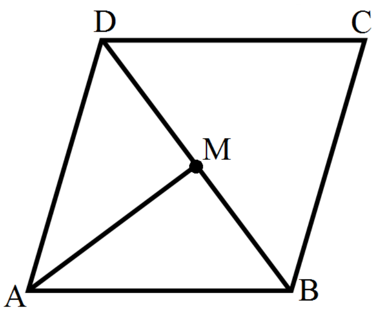
$\Rightarrow BD^2 = AD^2 + AB^2 - 2AB \times AF$

$\Rightarrow AC^2 + BD^2 = BC^2 + AD^2 + 2AB(AB - BE - AF)$

$= BC^2 + AD^2 + 2AB \times EF$

$= BC^2 + AD^2 + 2AB \times CD$

26. In the given figure, ABCD is a parallelogram, M is the mid-point of BD and BD bisects $\angle B$ as well as $\angle D$. Then, $\angle AMB = ?$



(A) 45°

(B) 60°

(C) 90°

(D) 30°

Ans. :

c. 90°,

Solution:

$\angle ABC = \angle ADC$ ...(Opposite angles of a parallelogram are equal)

$\Rightarrow \frac{1}{2}\angle ABC = \frac{1}{2}\angle ADC$

$\Rightarrow \angle ABD = \angle ADB$

So, $AD = AB$ ...(Sides opposite equal angles are equal.)

$\therefore \triangle ABD$ is isosceles

Also, M is the mid-point of BD.

$\therefore AM \perp BD$

$\therefore \angle AMB = 90^\circ$

27. In quadrilateral ABCD, if $\angle A = 60^\circ$ and $\angle B : \angle C : \angle D = 2 : 3 : 7,$ then $\angle D$ is:

(A) 175º (B) 25º (C) 180º (D) 50º

Ans. :

a. 175º

Solution:

In quadrilateral, the sum of the all four angles equal to 360º.

Let $\angle B = 2x,\ \angle C = 3x$ and $\angle D = 7x.$

$\angle A + \angle B + \angle C + \angle D = 360^\circ$

60 + 2x + 3x + 7x = 360

12x = 300

x = 25

So, $\angle D = 7x = 7(25) = 175^\circ$

28. If area of a Parallelogram with sides ‘a’ and ‘b’ is A and that of a rectangle with sides ‘a’ and ‘b’ is B, then

(A) None of these (B) A = B (C) A > B (D) A < B

Ans. :

d. A < B

Solution:

Area of Parallelogram = Base × Height

If 'a' is the side and 'b' is the base the height will be less than 'a' using Pythagoras theorem, a as Hypotenuse, h as height, A < B.

29. In quadrilateral ABCD, if $\angle A = 60^\circ$ and $\angle B : \angle C : \angle D = 2 : 3 : 7,$ then $\angle D$ is:

(A) 175º (B) 180º (C) 25º (D) 50º

Ans. :

a. 175º

Solution:

In quadrilateral, the sum of the all four angles equal to 360º. let

$\angle B = 2x,\ \angle C = 3x$ and $\angle D = 7x.$

$\angle A + \angle B + \angle C + \angle D = 360^\circ$

60 + 2x + 3x + 7x = 360

$12x = 300^o$

$x = 25^o$

So, $\angle D = 7x = 7(25^\circ) = 175^\circ$

30. If angles A, B, C and D of the quadrilateral ABCD, taken in order, are in the ratio 3 : 7 : 6 : 4, then ABCD is a:

(A) Kite (B) Parallelogram (C) Trapezium (D) Rhombus

Ans. :

c. Trapezium

Solution:

Let the angles be 3x, 7x, 6x, 4x

then 3x + 7x + 6x + 4x = 360

$x = \frac{360}{20} = 18$

So angles are,

54º, 126º, 108º & 72º

Hence it is a trapezium.

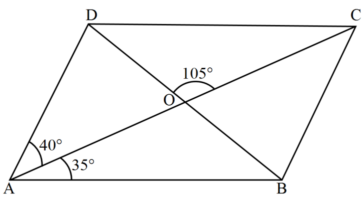
31. ABCD is a Parallelogram in which $\angle BAO = 35^\circ,\ \angle DAO = 40^\circ$ and $\angle COD = 105^\circ$. Find $\angle ABO =\ ?$

(A) 45º (B) 30º (C) 20º (D) 40º

Ans. :

d. 40º

Solution:



Given, ABCD is a parallelogram having $\angle BAO = 35^\circ,\ \angle DAO = 40^\circ$ and $\angle COD = 105^\circ$.

Now, $\angle COD = \angle AOB = 105^\circ$ [vertically opposite angles]

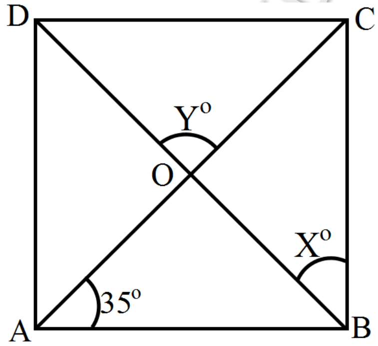
In $\angle ABO,$ by angle sum property of triangle,

$\Rightarrow \angle AOB + \angle OAB + \angle ABO = 180^\circ$

$\Rightarrow 105^\circ + 35^\circ + \angle ABO = 180^\circ$

$\Rightarrow \angle ABO = 40^\circ$

32. In the figure, ABCD is a Rectangle. Find the values of x and y?



(A) x = 100º and y = 100º

(B) x = 60º and y = 120º

(C) x = 55º and y = 110º

(D) x = 50º and y = 100º

Ans. :

c. x = 55º and y = 110º

Solution:

ABCD is a rectangle

The diagonals of a rectangle are congruent and bisect each other. Therefore, in $\triangle \mathrm{AOB}$,

we have:

OA = OB

$\angle \mathrm{OAB} = \angle \mathrm{OBA} = 35^\circ$

$\mathrm{x} = 90^\circ - 35^\circ = 55^\circ$ and $\angle \mathrm{AOB} = 180^\circ - (35^\circ + 35^\circ) = 110^\circ$

$\mathrm{y} = \angle \mathrm{AOB} = 110^\circ$ [Vertically opposite angles]

Hence, x = 55° and y = 110°

33. If an angle of a parallelogram is two-third of its adjacent angle, the smallest angle of the parallelogram is:

(A) 108º

(B) 81º

(C) 54º

(D) 72º

Ans. :

d. 72º

Solution:

Let x be one angle. Then $\mathrm{x} + \frac{2}{3\mathrm{x}} + 23\mathrm{x} = 180$ {sum of the adjacent angles of a parallelogram is 180º}

x = 108, adjacent angle = 180 - 108 = 72º

34. If one angle of a parallelogram is 24° less than twice the smallest angle, then the measure of the largest angle of the largest angle of the parallelogram is:

(A) 176°

(B) 68°

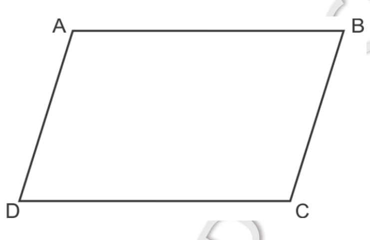
(C) 112°

(D) 102°

Ans. :

c. 112°

Solution:



Let the smallest angle $= \angle \mathrm{ADC} = \mathrm{x}^\circ$

Other angle $\angle \mathrm{BCD}$

$\Rightarrow \angle \mathrm{BCD} = 2\mathrm{x}^\circ - 24^\circ$

Also, $\angle \mathrm{ACD} + \angle \mathrm{BCD} = 180^\circ$ (Sum of adjacent angles in $||^{\text{gram}}$ = 180°)

$\Rightarrow \mathrm{x}^\circ + 2\mathrm{x}^\circ - 24^\circ = 180^\circ$

$\Rightarrow 3\mathrm{x}^\circ = 204^\circ$

$\Rightarrow \mathrm{x} = 68^\circ$

⇒ Largest angle $= \angle \mathrm{BCD} = 2 \times 68^\circ - 24^\circ = 112^\circ$

35. ABCD is a trapezium in which $\mathrm{AB} \parallel \mathrm{DC}$. M and N are the mid-points of AD and BC respectively. If AB = 12cm, MN = 14cm, then CD = ?

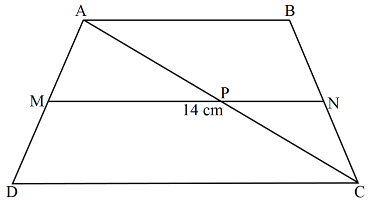
(A) 16cm (B) 12cm (C) 10cm (D) 14cm

Ans. :

a. 16cm

Solution:

Given,



ABCD is a trapezium,

$\mathrm{AB} \parallel \mathrm{DC}$

M, N are mid-points of AD & BC

AB = 12cm, MN = 14cm

$\because \mathrm{AB} \parallel \mathrm{MN} \parallel \mathrm{CD}$ [M, N are mid points of AD & BC]

MP = NP

By mid-point theorem,

$\mathrm{MP} = \frac{1}{2}\mathrm{CD}$ and $\mathrm{NP} = \frac{1}{2}\mathrm{AB}$

$\therefore\ \mathrm{MN} = \frac{1}{2}(\mathrm{AB} + \mathrm{CD})$

$\Rightarrow\ 14 = \frac{1}{2}(12\ +\ \mathrm{CD})$

$\Rightarrow \mathrm{CD} = 28\ -\ 12 = 16\mathrm{cm}$

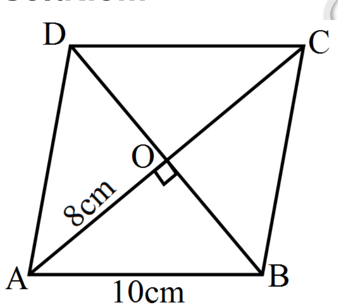
36. The length of each side of a rhombus is 10cm and one if its diagonals is of length 16cm. The length of the other diagonal is:

(A) 13cm (B) 12cm (C) $2\sqrt{39}\,\mathrm{cm}$ (D) 6cm

Ans. :

b. 12cm.

Solution:



Let ABCD be the rhombus with diagonals AB = 10cm and Ac = 16cm.

Since the diagonals of a rhombus are perpendicular bisectors of each other,

$\Rightarrow \mathrm{OA} = 8\mathrm{cm}, \mathrm{BD} = 2\mathrm{OB}$ and $\angle\mathrm{AOB} = 90^\circ$

In right $\triangle\mathrm{AOB}$,

By Pythagoras theorem,

$\mathrm{AB}^2 = \mathrm{OA}^2 + \mathrm{OB}^2$

$\Rightarrow (10)^2 = (8)^2 + \mathrm{OB}^2$

$\Rightarrow 100 = 64 + \mathrm{OB}^2$

$\Rightarrow \mathrm{OB}^2 = 36$

$\Rightarrow \mathrm{OB} = \sqrt{36}$

$\Rightarrow \mathrm{OB} = 6\mathrm{cm}$

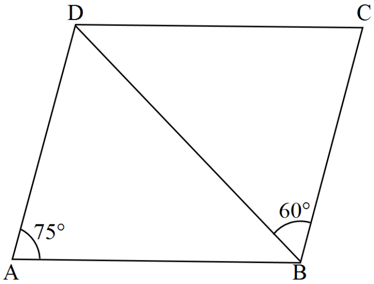
$\Rightarrow \mathrm{BD} = 2 \times \mathrm{OB}$

$\Rightarrow \mathrm{BD} = 2 \times 6$

$\Rightarrow \mathrm{BD} = 12\mathrm{cm}$

Hence, the lenght of the other diagonal is 12cm.

37. In the given figure, ABCD is a parallelogram in which $\angle \mathrm{BAD} = 75^\circ$ and $\angle \mathrm{CBD} = 60^\circ$. Then, $\angle \mathrm{BDC} = \ ?$



(A) 45º (B) 75º (C) 50º (D) 60º

Ans. :

a. 45º

Solution:

It is given in the question that,

In parallelogram ABCD: $\angle \mathrm{BAD} = 75^\circ,\ \angle \mathrm{CBD} = 60^\circ$

Now, $\angle \mathrm{DAB} = \angle \mathrm{DCB} = 75^\circ$ (Opposite angles)

Also, in triangle DBC we know that sum of angles of a triangle is 180º

$\angle \mathrm{DBC} + \angle \mathrm{BDC} + \angle \mathrm{DCB} = 180^\circ$

$60^\circ + \angle \mathrm{BDC} + 75^\circ = 180^\circ$

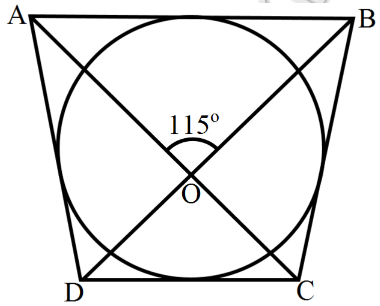
$135^\circ + \angle \mathrm{BDC} = 180^\circ$

$\angle \mathrm{BDC} = 180^\circ - 135^\circ$

$\angle \mathrm{BDC} = 45^\circ$

Hence, 45º is correct.

38. In Fig. the quadrilateral ABCD circumscribes a circle with centre O. If $\angle \mathrm{AOB} = 115^\circ$, then find $\angle \mathrm{COD}$.



(A) 23º (B) 24º (C) 127º (D) 115º

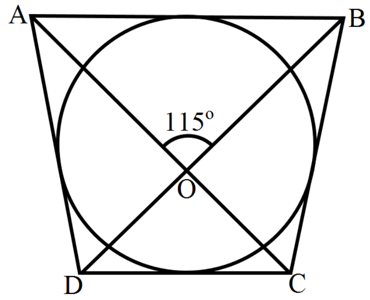
Ans. :

d. 115º

Solution:

$\therefore \angle AOB = \angle COD$ (vertically opposite angle)

$\therefore \angle COD = 115^\circ$



39. If one angle of a parallelogram is 24º less than twice the smallest angle, then the measure of the largest angle of the parallelogram is:

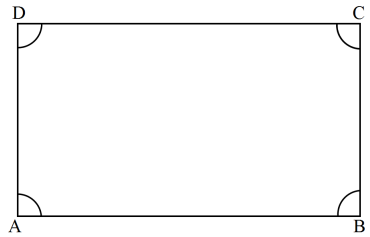
(A) 112º (B) 176º (C) 68º (D) 102º

Ans. :

a. 112º

Solution:

Let angles of parallelogram are $\angle A, \angle B, \angle C, \angle D$



Let smallest angle $= \angle A$

Let largest angle $= \angle B$

$= \angle B = 2\angle A - 24^\circ \ldots \text{(i)}$

$\angle A + \angle B = 180^\circ$ [adjacent angle of parallelogram]

So, $\angle A + 2\angle A - 24^\circ = 180^\circ$

$= 3\angle A = 180^\circ + 24^\circ = 204^\circ$

$= \angle A = \frac{204^\circ}{3} = 68^\circ$