Coordinate Geometry Questions for SNAP

Questions

Instructions
For the following questions answer them individually

Question 1

What is the equation of a circle with centre of origin and radius is 6 cm?

A $x^2 + y^2 - y = 36$

B $x^2 + y^2 - x - y = 36$

C $x^2 + y^2 - 36 = 0$

D $x^2 + y^2 - x = 36$

Answer: C

Explanation:
Given,

Center of the circle = (0,0)

Radius of the circle (r) = 6 cm

$\therefore$ Equation of the circle is $x^2 + y^2 = r^2$

$=> x^2 + y^2 = 6^2$

$=> x^2 + y^2 = 36$

$=> x^2 + y^2 - 36 = 0$

Hence, the correct answer is Option C

Question 2

The equation of circle with centre (1, -2) and radius 4 cm is:

A $x^2 + y^2 + 2x - 4y = 11$

B $x^2 + y^2 + 2x - 4y = 16$

C $x^2 + y^2 - 2x + 4y = 16$

D $x^2 + y^2 - 2x + 4y = 11$

Answer: D

Explanation:
Given,

Centre of the circle (a, b) = (1, -2)

Radius of the circle (r) = 4 cm

$\therefore$ Equation of the circle is $(x - a)^2 + (y - b)^2 = r^2$

$=> (x - 1)^2 + (y - (-2))^2 = 4^2$

$=> (x - 1)^2 + (y + 2)^2 = 4^2$

$=> x^2 + 1^2 - 2.x.1 + y^2 + 2^2 + 2.y.2 = 16$

$=> x^2 + 1 - 2x + y^2 + 4 + 4y = 16$

$=> x^2 - 2x + y^2 + 4y = 16 - 1 - 4$

$=> x^2 + y^2 - 2x + 4y = 11$

Hence, the correct answer is Option D

Question 3

In $\triangle ABC, AB = AC$. A circle drawn through B touches AC at D and intersect AB at P. If D is the mid point of AC and AP 2.5 cm, then AB is equal to:

A 9 cm

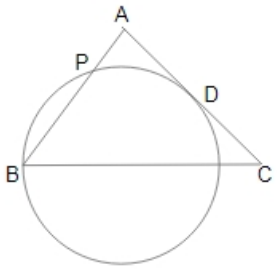
B 10 cm

C 7.5 cm

D 12.5 cm

Answer: B

Explanation:



Given D is midpoint of AC so,

AD = $\frac{AC}{2}$

But also given AC = AB

AD = $\frac{AB}{2}$ ---(1)

AD is a tangent and APB is a secant. So the tangent secant theorem can be applied,

$AD^2 = AP \times AB$

$(\frac{AB}{2})^2 = 2.5 \times AB$

$\frac{AB^2}{4} = 2.5 \times AB$

AB = 10 cm

Question 4

The graph of the equations $5x - 2y + 1 = 0$ and $4y - 3x + 5 = 0$, interest at the point $P(\alpha, \beta)$, What is the value of $(2\alpha - 3\beta)$?

A 4

B 6

C -4

D -3

Answer: A

Explanation:

$5x - 2y + 1 = 0$

15x - 6y + 3 = 0 ---(1)

$3x - 4y - 5 = 0$

15x - 20y - 25 = 0 ---(2)
From eq (1) and (2),
14y + 28 = 0
y = -2
From eq(1),
15x + 6×2 + 3 = 0
x = -1
α = -1
β = -2
$(2\alpha - 3\beta)$
= $(2 \times (-1) + 3 \times 2)$ = 4

Question 5

What is the area (in square units) of the triangular region enclosed by the graphs of the equations x + y = 3, 2x + 5y = 12 and the x-axis?

A 2

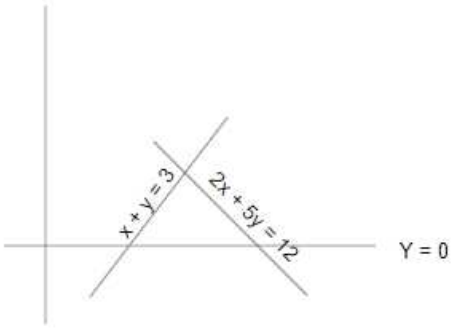
B 3

C 4

D 6

Answer: B

Explanation:



x + y = 3
2x + 2y = 6 ---(1)
2x + 5y = 12 ---(2)
From eq (1) and eq (2),
3y = 6
y = 2
So height = 2
y = 0 ---(3)
put the value of y in eq(1) and (2),
2x = 6
x = 3
And 2x = 12
x = 6
Area = $\frac{1}{2} \times base \times height$
= $\frac{1}{2} \times (6 - 3) \times 2$ = 3 square units

Question 6

The graphs of the equations $2x + 3y = 11$ and $x - 2y + 12 = 0$ intersects at $P(x_1, y_1)$ and the graph of the equations $x - 2y + 12 = 0$ intersects the x-axis at $Q(x_2, y_2)$. What is the value of $(x_1 - x_2 + y_1 + y_2)$?

A 13

B -11

C 15

D -9

Answer: C

Explanation:

$2x + 3y = 11$ ---(1)

$x - 2y + 12 = 0$

$2x - 4y = -24$ ---(2)

From eq (1) and (2),

7y = 35

y = 5 = y_1

From eq (1),

$2x + 3\backslash times5 = 11$

2x = -4

x = -2 = x_1

Now,

The graph of the equations $x - 2y + 12 = 0$ intersects the x-axis.

So,

$y = y_1$ = 0

$x - 0 + 12 = 0$

x = -12 = x_1

$(x_1 - x_2 + y_1 + y_2)$

= -2 + 12 + 5 + 0 = 15

Question 7

The point of intersection of the graphs of the equations 3x — 5y = 19 and 3y —7x + 1 =0 is P (α, β) . Whatis the value of $(3\alpha - \beta)$?

A -2

B -1

C 1

D 0

Answer: B

Explanation:

The point of intersection of the graphs of the equations 3x — 5y = 19 and 3y —7x + 1 =0 is P (α, β)

So,

$3\alpha—5\beta = 19$ ---(1)

$7\alpha—3\beta = 1$ ---(2)

Eq(1) multiply by 3 and eq (2) multiply by 5,

$9\alpha—15\beta = 57$ ---(1)

$35\alpha—15\beta = 5$ ---(2)

From eq (3) and (4),

$26\alpha = -52$

$\alpha = -2$

From eq (1),

$3\times - 2 - 5\beta = 19$

$\beta = -5$

Now,

$(3\alpha - \beta)$
= $(3 \times -2 + 5s)$
= -1

Question 8

The graph of the equation x − 7y = −42, intersects the y-axis at $P(\alpha, \beta)$ and the graph of 6x + y - 15 = 0, intersects the x-axis at $Q(\gamma, \delta)$, What is the value of $\alpha + \beta + \gamma + \delta$?

A $\frac{17}{2}$

B 6

C $\frac{9}{2}$

D 5

Answer: A

Explanation:
The graph of the equation x − 7y = −42, intersects the y-axis at $P(\alpha, \beta)$
So, x = 0
0 - 7y = -42
y = 6
α = 0
β = 6
graph of 6x + y - 15 = 0, intersects the x-axis at $Q(\gamma, \delta)$
So, y = 0
6x - 15 = 0
x = 5/2
γ = 5/2
δ = 0
Now,
$\alpha + \beta + \gamma + \delta$
= 0 + 6 + 5/2 + 0 = $\frac{17}{2}$

Question 9

The graphs of the equations $3x + y - 5 = 0$ and $2x - y - 5 = 0$ intersect at the point $P(\alpha, \beta)$. What is the value of $(3\alpha + \beta)$?

A 4

B -4

C 3

D 5

Answer: D

Explanation:
When graphs of the equations intersect at the point $P(\alpha, \beta)$ then,
$3\alpha + \beta - 5 = 0$ ---(1)
$2\alpha - \beta - 5 = 0$ ---(2),
On eq(1) + (2),
$5\alpha - 10 = 0$
$\alpha = 2$
From the eq(2),
$3 \times 2 + \beta - 5 = 0$
$\beta = -1$
Now,

$(3\alpha + \beta)$ = 3 × 2 - 1 = 6 - 1 = 5

∴ The correct answer is option D.

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Question 10

The graph of x + 2y = 3 and 3x - 2y = 1 meet the Y-axis at two points having distance

A $\frac{8}{3}$ units

B $\frac{4}{3}$ units

C 1 units

D 2 units

Answer: D

Explanation:

on Y axis, x=0

put x = 0 in x+2y = 3

2y = 3

$y = \frac{3}{2}$

putting x=0 in 3x-2y = 1

-2y = 1

$\frac{-1}{2}$

therefore points on Y-axis are

$(0, \frac{3}{2}) and (0, \frac{-1}{2})$

required distance = $\sqrt{(}(0-0)^2 + \sqrt{(}\frac{3}{2} + \frac{1}{2})^2$

$= \sqrt{(}0+4)$ = 2 units

Question 11

ABCDis a cyclic quadrilateral, AB and DC when produced meet at P, if PA = 8 cm, PB = 6 cm, PC = 4 cm, then the length (in cm) of PDis

A 6

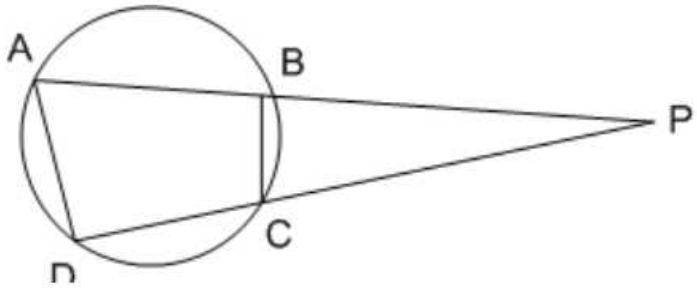
B 12

C 8

D 10

Answer: B

Explanation:



Given that,PA = 8 cm, PB = 6 cm, PC = 4 cm

As per tangent & secant rule,

$PA \times PB = PD \times PC$

=>$PD = {}^{8\times6}_{4} = 12cm$

Question 12

In a circle, chords AD and BC meet at a point E outside the circle. If ∠BAE = 76° and ∠ADC= 102° , then ∠AEC is equal to:

A 25°

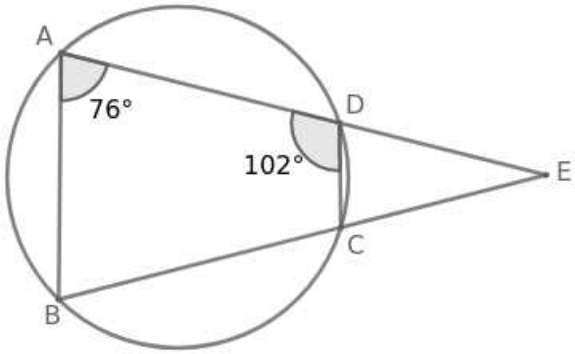
B 28°

C 26°

D 24°

Answer: C

Explanation:



In cyclic quadrilateral ABCD, sum of opposite angles = 180 °

=> ∠BAE + ∠BCD = 180°

=> 76° + ∠BCD = 180°

=> ∠BCD = 104°

From the figure,

∠ADC + ∠EDC = 180°

=> 102° + ∠EDC = 180°

=> ∠EDC = 78°

∠BCD + ∠ECD = 180°

=> 104° + ∠ECD = 180°

=> ∠ECD = 76°

In △ CDE,

∠DEC + ∠ECD + ∠EDC = 180°

=> ∠AEC + 76° + 78° = 180°

=> ∠AEC + 154° = 180°

=> ∠AEC = 26°

Hence, the correct answer is Option C

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Question 13

If △ABC, ∠ABC=90° and BD⊥AC , if AD = 4cm and CD = 5cm then BD is equal to

A $3\sqrt{5}$

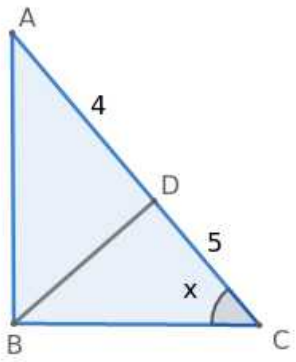
B $2\sqrt{5}$

C $3\sqrt{2}$

D $4\sqrt{5}$

Answer: B

Explanation:



Let ∠ C = x

In △ABC,

$\cos x = \frac{BC}{9}$

=> BC = 9 $\cos x$

In △BCD,

$\cos x = \frac{5}{BC}$

=> $\cos x = \frac{5}{9\cos x}$

=> $\cos^2 x = \frac{5}{9}$

=> $\cos x = \frac{\sqrt{5}}{3}$

$\Rightarrow \sin x = \sqrt{1-\cos^2 x} = \sqrt{1-\frac{5}{9}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$

In $\triangle$BCD,

$\sin x = \frac{BD}{BC}$

$\Rightarrow \frac{2}{3} = \frac{BD}{9\cos x}$

$\Rightarrow \frac{2}{3} = \frac{BD}{9\left(\frac{\sqrt{5}}{3}\right)}$

$\Rightarrow \frac{2}{3} = \frac{3BD}{9(\sqrt{5})}$

$\Rightarrow$ BD = $2\sqrt{5}$

Hence, the correct answer is Option B

Question 14

In $\triangle$ABC, $\angle A = 72^\circ$. Its sides AB and AC are produced to the points D and E respectively. If the bisectors of the $\angle$CBD and $\angle$BCE meet at point O, then $\angle$BOC is equal to:

A 16°

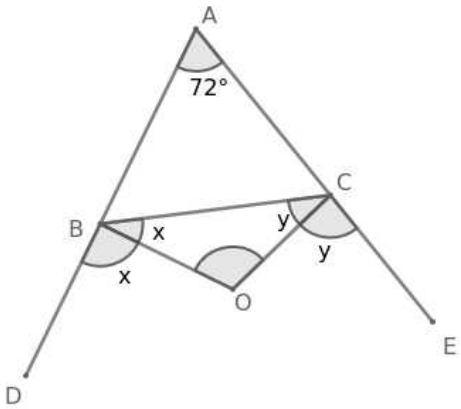
B 54°

C 32°

D 106°

Answer: B

Explanation:



Given,

In $\triangle$ABC, $\angle A = 72^\circ$

OB is the angular bisector of $\angle$CBD

$\Rightarrow \angle OBD = \angle OBC$

Let $\angle OBD = \angle OBC = x$

OC is the angular bisector of $\angle$BCE

$\Rightarrow \angle OCE = \angle OCB$

Let $\angle OCE = \angle OCB = y$

From the figure,

$\angle ABC + \angle CBD = 180^\circ$

=> ∠ABC + x + x = 180°

=> ∠ABC = 180°- 2x

∠ACB + ∠BCE = 180°

=> ∠ACB + y + y = 180°

=> ∠ACB = 180°- 2y

In △ABC,

∠ABC + ∠ACB + ∠BAC = 180°

=> 180°- 2x + 180°- 2y + 72° = 180°

=> 2x + 2y = 180° + 72°

=> 2$(x + y)$ = 252°

=> $x + y$ = 126° .....(1)

In △OBC,

∠OBC + ∠OCB + ∠BOC = 180°

=> x + y + ∠BOC = 180°

=> 126° + ∠BOC = 180°

=> ∠BOC = 180°- 126°

=> ∠BOC = 54°

Hence, the correct answer is Option B

Question 15

The distance between the centres of two circles of radius 2.5 cm each is 13 cm. The length (in cm)of a transverse common tangent is:

A 12

B 8

C 6

D 10

Answer: A

Explanation:

Radius of first circle (r_1) = 2.5 cm

Radius of second circle (r_2) = 2.5 cm

The distance between centres of two circles (d) = 13 cm

∴ Length of the common tangent = $\sqrt{d^2 - (r_1 + r_2)^2}$

$= \sqrt{13^2 - (2.5 + 2.5)^2}$

$= \sqrt{169 - 25}$

$= \sqrt{144}$

$=$ 12 cm

Hence, the correct answer is Option A

Question 16

ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and ∠ADC = 126°. ∠BAC is equal to:

A 24°

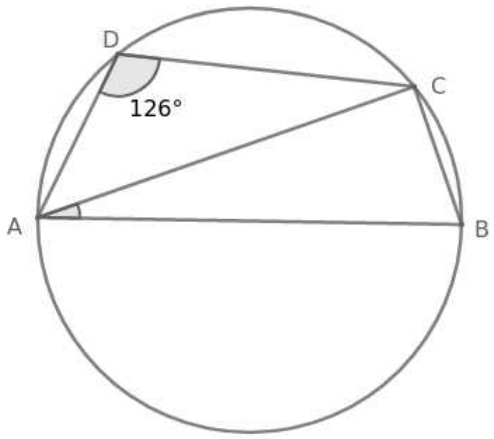
B 72°

C 18°

D 36°

Answer: D

Explanation:



In cyclic quadrilateral ABCD, sum of opposite angles = 180°

=> ∠ADC + ∠ABC = 180°

=> 126° + ∠ABC = 180°

=> ∠ABC = 54°

Angle subtended by diameter in a semicircle is 90°

=> ∠ACB = 90°

In △ ACB,

∠BAC + ∠ACB + ∠ABC = 180°

=> ∠BAC + 90° + 54° = 180°

=> ∠BAC + 144° = 180°

=> ∠BAC = 36°

Hence, the correct answer is Option D

Question 17

In △ABC, ∠A = 52°. Its sides AB and AC are produced to the points D and E respectively. If the bisectors of the ∠CBD and ∠BCE meet at point O, then ∠BOC is equal to:

A 64°

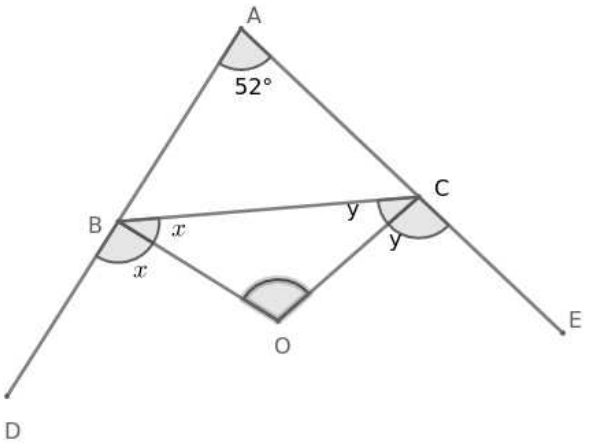
B 16°

C 106°

D 32°

Answer: A

Explanation:



Given,

In △ABC, ∠A = 52°

OB is the angular bisector of ∠CBD

=> ∠OBD = ∠OBC

Let ∠OBD = ∠OBC = x

OC is the angular bisector of ∠BCE

=> ∠OCE = ∠OCB

Let ∠OCE = ∠OCB = y

From the figure,

∠ABC + ∠CBD = 180°

=> ∠ABC + x + x = 180°

=> ∠ABC = 180°- 2x

∠ACB + ∠BCE = 180°

=> ∠ACB + y + y = 180°

=> ∠ACB = 180°- 2y

In △ABC,

∠ABC + ∠ACB + ∠BAC = 180°

=> 180°- 2x + 180°- 2y + 52° = 180°

=> 2x + 2y = 180° + 52°

=> $2(x+y)$ = 232°

=> $x+y$ = 116° .....(1)

In △OBC,

∠OBC + ∠OCB + ∠BOC = 180°

=> x + y + ∠BOC = 180°

=> 116° + ∠BOC = 180°

=> ∠BOC = 180°- 116°

=> ∠BOC = 64°

Hence, the correct answer is Option A

Question 18

PA and PB are the tangents to a circle with centre O, from a point P outside the circle. A and B are the points on the circle. If ∠APB = 72°, then ∠OAB is equal to:

A 24°

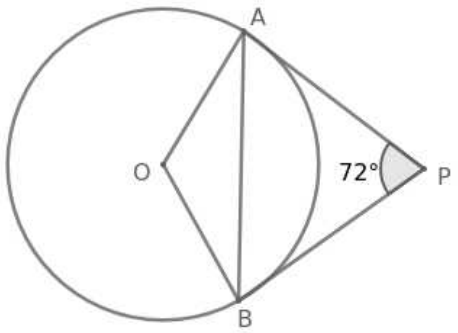
B 18°

C 36°

D 72°

Answer: C

Explanation:



Given, ∠APB = 72°

PA and PB are the tangents to the circle with centre O

=> ∠OAP = 90° and ∠OBP = 90°

In quadrilateral OAPB,

∠AOB + ∠OBP + ∠APB + ∠OAP = 360°

=> ∠AOB + 90° + 72° + 90° = 360°

=> ∠AOB + 252° = 360°

=> ∠AOB = 108°

In △ OAB, OA = OB

Angles opposite to equal sides are equal in triangle

=> ∠OBA = ∠OAB

In △ OAB,

∠AOB + ∠OBA + ∠OAB = 180°

=> 108° + ∠OAB + ∠OAB = 180°

=> 2∠OAB = 72°

=> ∠OAB = 36°

Hence, the correct answer is Option C

Question 19

The distance between the centres of two circles of radius 3 cm and 2 cm is 13 cm. The length (in cm) of a transverse common tangent is:

A 8

B 12

C 6

D 10

Answer: B

Explanation:

Radius of first circle (r_1) = 3 cm

Radius of second circle (r_2) = 2 cm

The distance between centres of two circles (d) = 13 cm

$\therefore$ Length of the common tangent = $\sqrt{d^2-(r_1+r_2)^2}$

$=\sqrt{13^2-(3+2)^2}$

$=\sqrt{169-25}$

$=\sqrt{144}$

$=12$ cm

Hence, the correct answer is Option B

Question 20

The distance between the centre of two circles of radius 4 cm and 2 cm is 10 cm. The length (in cm) of a transverse common tangent is:

A 4

B 6

C 10

D 8

Answer: D

Explanation:

Given, distance between centres of circles (d) = 10 cm

Radius of first circle (r_1) = 4 cm

Radius of second circle (r_2) = 2 cm

$\therefore$ The length of tranverse common tangent = $\sqrt{d^2-(r_1+r_2)^2}=\sqrt{10^2-(4+2)^2}=\sqrt{100-36}=8\ cm$

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