NDA 1 2025

LIVE

MATHS

ANALYTICAL GEOMETRY 2D - 1

MCQS

NAVJYOTI SIR

Crack
EXAMS

28 Jan 2025 Live Classes Schedule

9:00AM	28 JANUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	28 JANUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

AFCAT 1 2025 LIVE CLASSES

12:30PM	REASONING - FIGURE CLASSIFICATION	RUBY MA'AM
3:00PM	STATIC GK - INDIAN FESTIVALS & FOLK DANCES	DIVYANSHU SIR
4:30PM	ENGLISH - SYNONYMS - CLASS 3	ANURADHA MA'AM
5:30PM	MATHS - RATIO & PROPORTION	NAVJYOTI SIR

NDA 1 2025 LIVE CLASSES

10:00AM	MATHS - ANALYTICAL GEOMETRY 2D - CLASS 1	NAVJYOTI SIR
11:30AM	ANCIENT & MEDIEVAL HISTORY	RUBY MA'AM
1:00PM	PHYSICS - MOTION	NAVJYOTI SIR
4:30PM	ENGLISH - SYNONYMS - CLASS 3	ANURADHA MA'AM

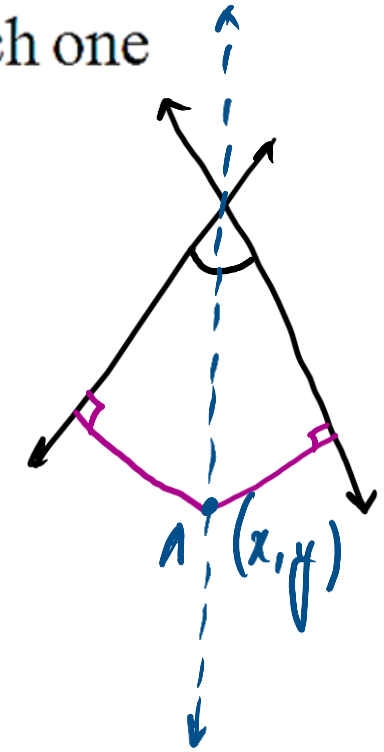
CDS 1 2025 LIVE CLASSES

11:30AM	ANCIENT & MEDIEVAL HISTORY	RUBY MA'AM
1:00PM	PHYSICS - MOTION	NAVJYOTI SIR
4:30PM	ENGLISH - SYNONYMS - CLASS 3	ANURADHA MA'AM
5:30PM	MATHS - RATIO & PROPORTION	NAVJYOTI SIR

Q) The bisector of the acute angle between the straight lines $3x - 4y - 3 = 0$ and $12x + 5y + 6 = 0$ passes through which one of the following points ?

(a) $(5, 3)$ (b) $(-3, 6)$

(c) $(2, 7)$ (d) $(-1, 4)$



Let the point be (x, y).

$$\frac{|3x - 4y - 3|}{\sqrt{3^2 + (-4)^2}} = \frac{|12x + 5y + 6|}{\sqrt{12^2 + 5^2}}$$

$$\frac{3x - 4y - 3}{5} = \frac{12x + 5y + 6}{13} \quad \text{or} \quad \frac{3x - 4y - 3}{5} = -\left(\frac{12x + 5y + 6}{13}\right)$$

$$\frac{3x-4y-3}{5} = \frac{12x+5y+6}{13}$$

or

$$\frac{3x-4y-3}{5} = -\left(\frac{12x+5y+6}{13}\right)$$

$$39x-52y-39 = 60x+25y+30$$

$$-77y = 69+21x$$

$$21x+77y+69=0$$

$$39x-52y-39 = -60x-25y-30$$

$$99x-27y-9=0$$

$$11x-3y-1=0$$

$(5,3)$, $(-3,6)$, $(2,7)$, $(-1,4)$

α, α $\quad \alpha, \alpha$ $\quad \alpha, \checkmark$

Which one of the following points on the line $2x - 3y = 5$ is equidistant from $(1, 2)$ and $(3, 4)$?

(a) $(7, 3)$ (b) $(4, 1)$

(c) $(1, -1)$ (d) $(-2, -3)$

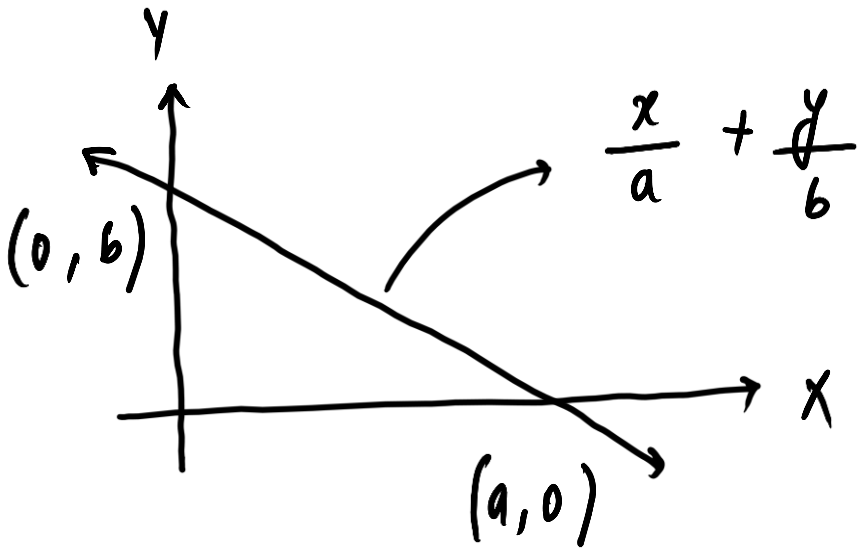
(a) $\sqrt{37}$; $\sqrt{17}$ ✗

(b) $\sqrt{10}$; $\sqrt{10}$ ✓

Ans. (b)

What is the equation of the straight line passing through the point (2, 3) and making an intercept on the positive Y-axis equal to twice its intercept on the positive X-axis?

(a) $2x + y = 5$ (b) $2x + y = 7$ (c) $x + 2y = 7$ (d) $2x - y = 1$



$\frac{x}{a} + \frac{y}{b} = 1$

$b = 2a$

$\frac{x}{a} + \frac{y}{2a} = 1$

$2x + y = 2a$

passing point (2, 3) → $2 \times 2 + 3 = 2a$

$7 = 2a$

$a = 7/2$

$\Rightarrow 2x + y = 7$

What is the radius of the circle

$4x^2 + 4y^2 - 20x + 12y - 15 = 0$?

(a) 14 units (b) 10.5 units

(c) 7 units (d) 3.5 units

Standard form of circle : $x^2 + y^2 + 2gx + 2fy + c = 0$

Divide by 4, $x^2 + y^2 - \frac{5}{2}x + 3y - \frac{15}{4} = 0$

Radius $= \sqrt{g^2 + f^2 - c} = \sqrt{\left(-\frac{5}{2}\right)^2 + \left(\frac{3}{2}\right)^2 + \frac{15}{4}} = \sqrt{\frac{49}{4}}$

$= \frac{7}{2} = 3.5$

(PYQ – 2024 – II)

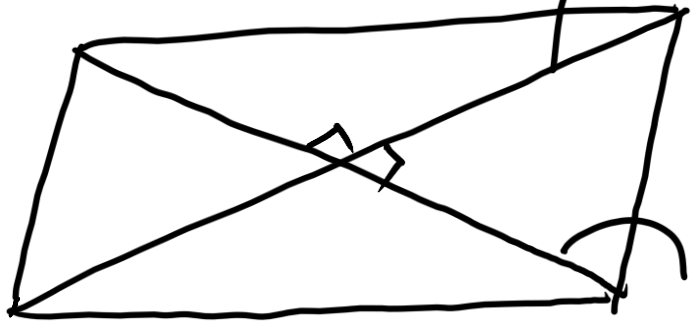
The diagonals of a quadrilateral $ABCD$ are along the lines $x-2y=1$ and $4x+2y=3$. The quadrilateral $ABCD$ may be a

(a) rectangle

(b) cyclic quadrilateral

(c) parallelogram

(d) rhombus



Slope, $m_1 = \frac{1}{2}$

Slope, $m_2 = \frac{-4}{2} = -2$

$m_1 m_2 = \frac{1}{2} \times -2 = -1$

So, the lines are perpendicular to each other.

(PYQ – 2024 – I)

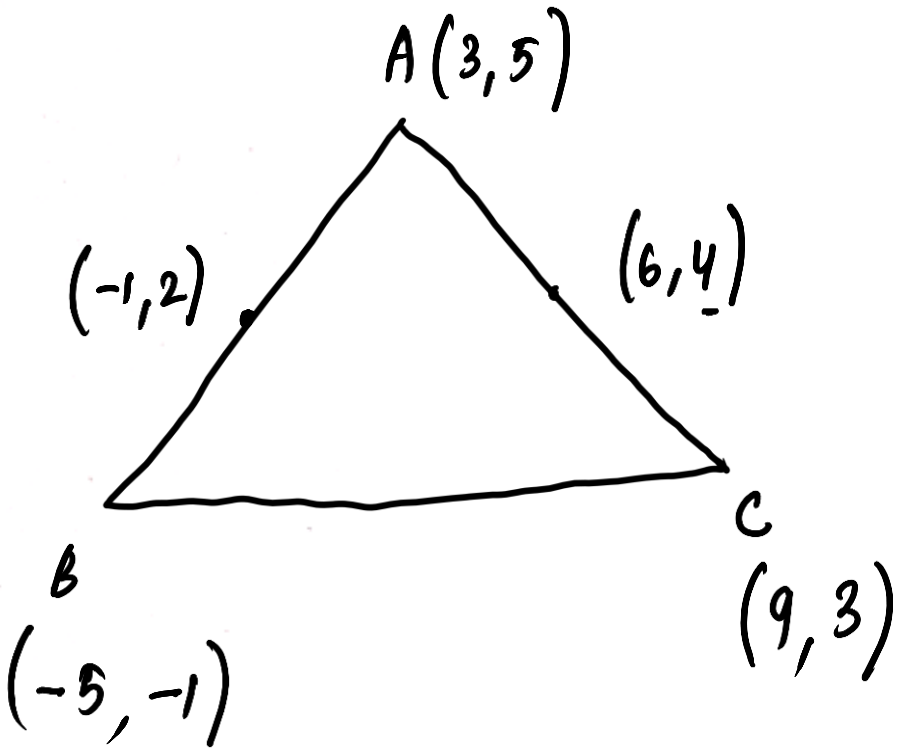
ABC is a triangle with $A(3, 5)$. The mid-points of sides AB, AC are at $(-1, 2)$, $(6, 4)$ respectively. What are the coordinates of centroid of the triangle ABC?

(a) $\left(\frac{8}{3}, \frac{11}{3}\right)$

(b) $\left(\frac{7}{3}, \frac{7}{3}\right)$

(c) $\left(2, \frac{8}{3}\right)$

(d) $\left(\frac{8}{3}, 2\right)$



$$\left(\frac{3-5+9}{3}, \frac{5-1+3}{3}\right)$$

centroid coordinates $\Rightarrow \left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right) = \left(\frac{7}{3}, \frac{7}{3}\right)$

(PYQ – 2024 – I)

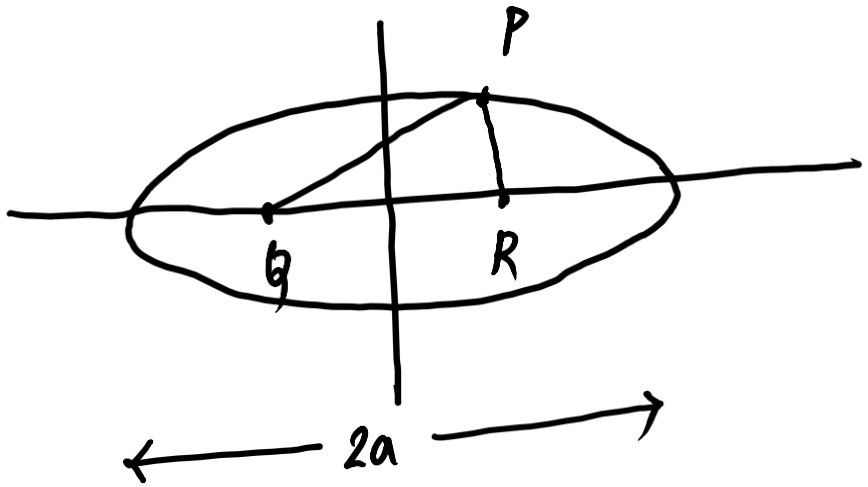
The foci of the ellipse $4x^2 + 9y^2 = 1$ are at Q and R. If $P(x, y)$ is any point on the ellipse, then what is $PQ + PR$ equal to?

(a) 2

(b) 1

(c) 2/3

(d) 1/3



$4x^2 + 9y^2 = 1$

$\frac{x^2}{\left(\frac{1}{4}\right)} + \frac{y^2}{\left(\frac{1}{9}\right)} = 1$ (standard form)

$a^2 = \frac{1}{4}$

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

$PQ + PR = 2a$

$= 2\left(\frac{1}{2}\right) = 1$

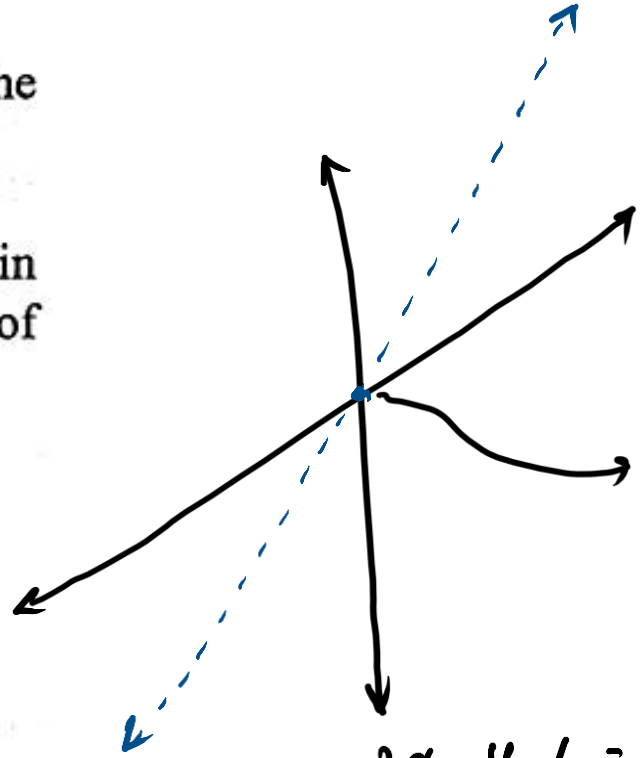
If a variable line passes through the point of intersection of the lines $x + 2y - 1 = 0$ and $2x - y - 1 = 0$ and meets the coordinate axes in A and B, then what is the locus of the mid-point of AB ?

(a) $3x + y = 10xy$

(b) $x + 3y = 10xy$ ✓

(c) $3x + y = 10$

(d) $x + 3y = 10$



point of intersection

$x = \frac{3}{5}$ & $y = \frac{1}{5}$

is satisfied

6y (b)

$2x + 4y = 2$

$2x - y = 1$

(−) (+) (−)

$5y = 1$

$y = \frac{1}{5}$

$2x = \frac{6}{5}$

$x = \frac{6}{10} = \frac{3}{5}$

. What is the equation to the straight line passing through the point $(-\sin\theta, \cos\theta)$ and perpendicular to the line $x\cos\theta + y\sin\theta = 9$?

(a) $x\sin\theta - y\cos\theta - 1 = 0$

(b) $x\sin\theta - y\cos\theta + 1 = 0$

(c) $x\sin\theta - y\cos\theta = 0$

(d) $x\cos\theta - y\sin\theta + 1 = 0$

$x\cos\theta + y\sin\theta = 9$

$\text{slope} = -\frac{\cos\theta}{\sin\theta} = -\cot\theta$,

$(-\sin\theta, \cos\theta)$ -ve reciprocal

$y - \cos\theta = \tan\theta\,(x - (-\sin\theta))$

$y - \cos\theta = \frac{\sin\theta}{\cos\theta}(x + \sin\theta)$

$y\cos\theta - \cos^2\theta = x\sin\theta + \sin^2\theta$

$y\cos\theta - x\sin\theta - 1 = 0$

$x\sin\theta - y\cos\theta + 1 = 0$

Ans. (b)

Two points P and Q lie on line $y = 2x + 3$. These two points P and Q are at a distance 2 units from another point $R(1, 5)$. What are the coordinates of the points P and Q?

(a) $\left(1+\frac{2}{\sqrt{5}}, 5+\frac{4}{\sqrt{5}}\right), \left(1-\frac{2}{\sqrt{5}}, 5-\frac{4}{\sqrt{5}}\right)$

(b) $\left(3+\frac{2}{\sqrt{5}}, 5+\frac{4}{\sqrt{5}}\right), \left(-1-\frac{2}{\sqrt{5}}, 5-\frac{4}{\sqrt{5}}\right)$

(c) $\left(1-\frac{2}{\sqrt{5}}, 5+\frac{4}{\sqrt{5}}\right), \left(1+\frac{2}{\sqrt{5}}, 5-\frac{4}{\sqrt{5}}\right)$

(d) $\left(3-\frac{2}{\sqrt{5}}, 5+\frac{4}{\sqrt{5}}\right), \left(-1+\frac{2}{\sqrt{5}}, 5-\frac{4}{\sqrt{5}}\right)$

$y = 2x + 3$

$\left(5+\frac{4}{\sqrt{5}}\right) = 2x + 3$

$2x = 2 + \frac{4}{\sqrt{5}} \Rightarrow x = 1 + \frac{2}{\sqrt{5}}$

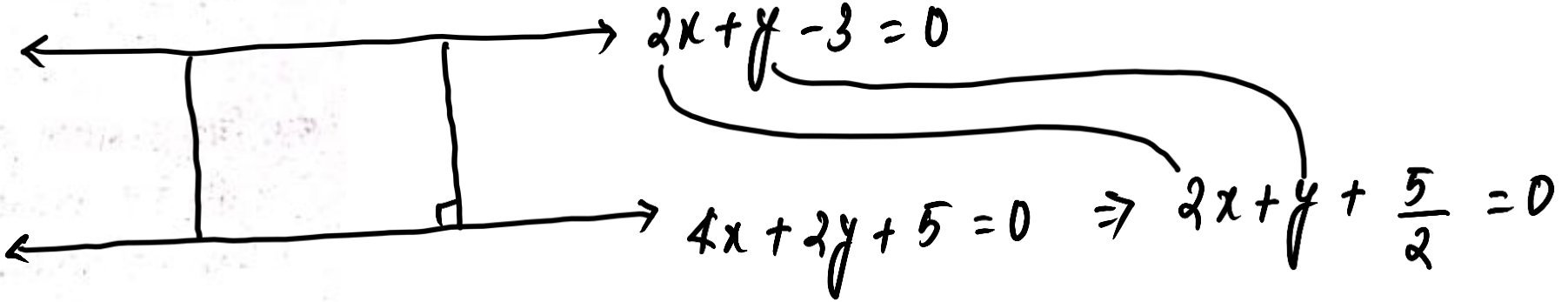
If two sides of a square lie on the lines $2x + y - 3 = 0$ and $4x + 2y + 5 = 0$, then what is the area of the square in square units ?

(a) 6·05

(b) 6·15

(c) 6·25

(d) 6·35



As lines are parallel, length of side will be equal to perpendicular distance between the parallel lines.

$$\text{side} = \frac{\left|\frac{5}{2} - (-3)\right|}{\sqrt{2^2 + 1^2}} = \frac{11/2}{\sqrt{5}} = \frac{11}{2\sqrt{5}}$$

$$d = \frac{|c_1 - c_2|}{\sqrt{a^2 + b^2}}$$

$$\text{Area} = (\text{side})^2$$

$$= \left(\frac{11}{2\sqrt{5}}\right)^2$$

$$= \frac{121}{20} = 6.05$$

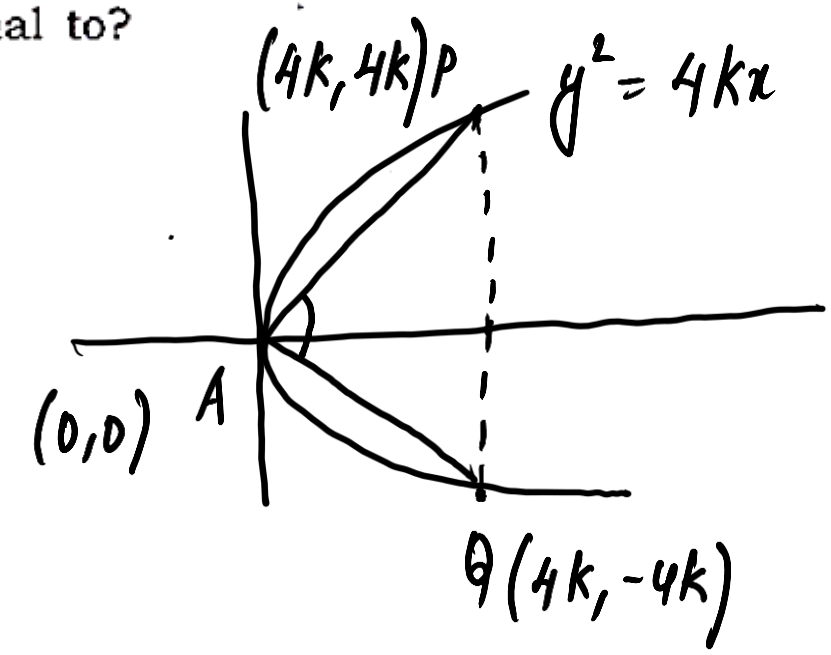
Consider the points $P(4k, 4k)$ and $Q(4k, -4k)$ lying on the parabola $y^2 = 4kx$. If the vertex is A, then what is $\angle PAQ$ equal to?

(a) 60°

(b) 90°

(c) 120°

(d) 135°



Slope of AP $= \frac{4k}{4k} = 1$ (m_1)

Slope of AQ $= \frac{-4k}{4k} = -1$ (m_2)

$m_1 \cdot m_2 = -1 \Rightarrow PA \perp QA$

$\angle PAQ = 90^\circ$

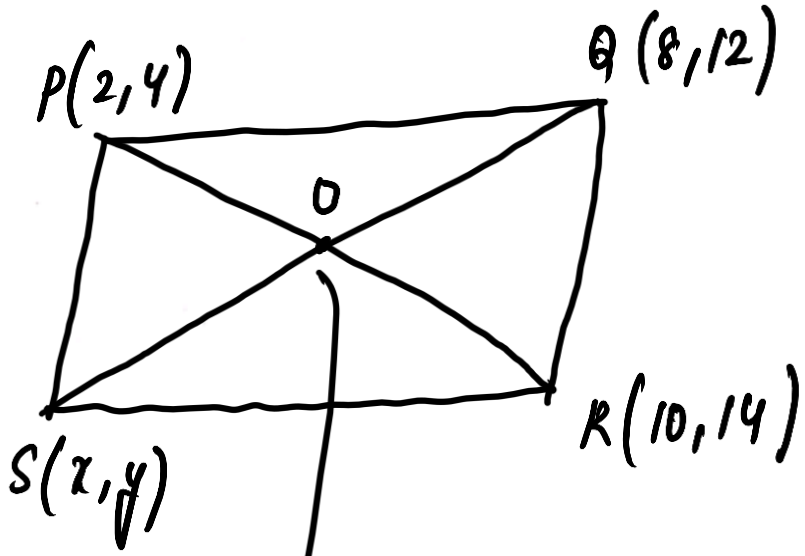
If $P(2, 4)$, $Q(8, 12)$, $R(10, 14)$ and $S(x, y)$ are vertices of a parallelogram, then what is $(x + y)$ equal to?

(a) 8

(b) 10

(c) 12

(d) 14



midpoint of both diagonals (diagonals bisect each other in a parallelogram)

Coordinates of $O = \left(\frac{2+10}{2}, \frac{4+14}{2}\right) \Rightarrow (6, 9)$

$\frac{8+x}{2} = 6 \quad \frac{12+y}{2} = 9$

$(4, 6)$

$x + y = 4 + 6 = 10$

A triangle ABC is inscribed in the circle $x^2 + y^2 = 100$. B and C have coordinates (6, 8) and (−8, 6) respectively.

What is $\angle BAC$ equal to?

(a) $\pi/2$

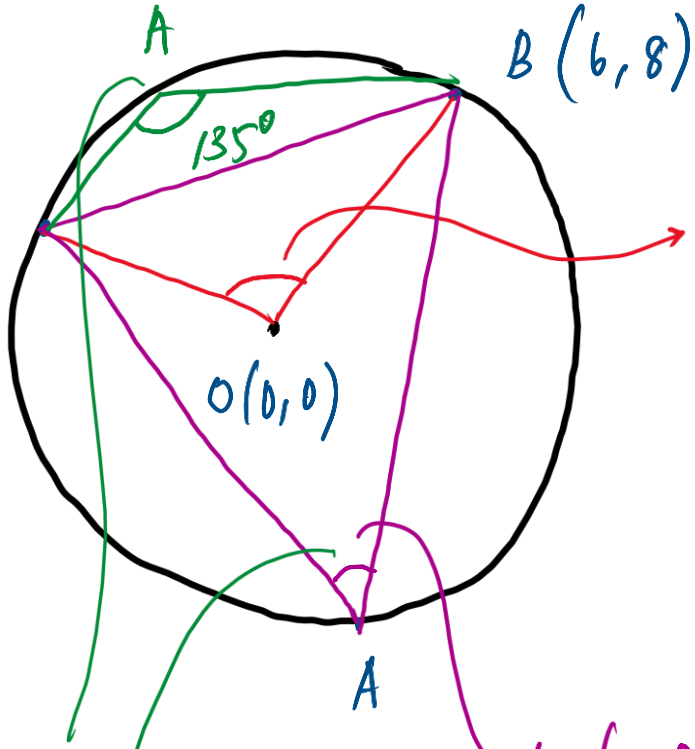
(b) $\pi/3$ or $2\pi/3$

(c) $\pi/4$ or $3\pi/4$

(d) $\pi/6$ or $5\pi/6$

$x^2+y^2 = 100$

$(x-0)^2 + (y-0)^2 = (10)^2$



Slope $(OB) = \frac{8}{6} = \frac{4}{3}$

Slope $(OC) = \frac{6}{-8} = \frac{3}{-4}$

$\frac{1}{2}(\angle OCB) = \frac{1}{2}\left(\frac{\pi}{2}\right) = \frac{\pi}{4}$

Supplementary angles (opp. angles of cyclic quadrilateral)

What are the coordinates of A?

(a) $(-6, 8)$

(b) $(-6, -8)$

(c) $(5\sqrt{2}, 5\sqrt{2})$

(d) Cannot be determined due to insufficient data

As position of A is not fixed.

Ans. (d)

What is the equation to the straight line joining the origin to the point of intersection of the lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$?

(a) $x+y=0$

(b) $x+y+1=0$

(c) $x-y=0$

(d) $x+y+2=0$

The value of k for which the lines $2x + 3y + a = 0$ and $5x + ky + a = 0$ represent family of parallel lines is

(a) 3 (b) 4.5

(c) 7.5 (d) 15

coeff. of x $\left\{ \frac{a_1}{a_2} = \frac{b_1}{b_2} \right\}$ coeff of y,

The point of intersection of diagonals of a square $ABCD$ is at the origin and one of its vertices is at $A(4, 2)$. What is the equation of the diagonal BD?

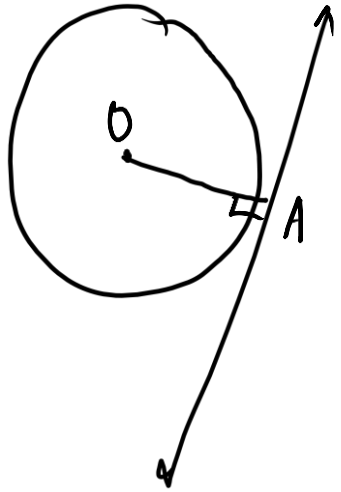
(a) $2x + y = 0$ (b) $2x - y = 0$

(c) $x + 2y = 0$ (d) $x - 2y = 0$

The equation of the tangents to the circle $x^2 + y^2 = 4$, which are parallel to $x + 2y + 3 = 0$, are

(a) $x - 2y = 2$ (b) $x + 2y = \pm 2\sqrt{3}$

(c) $x + 2y = \pm 2\sqrt{5}$ (d) $x - 2y = \pm 2\sqrt{5}$



perpendicular distance = radius of circle of O from tangent

$x + 2y + 3 = 0$

slope of tangent = $\frac{-1}{2}$

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