



## MATHS

### BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

#### STRAIGHT LINES

##### Solved Examples

1. A straight line meets the coordinates axes at A and B, so that the centroid of the triangle OAB is (1, 2). Then the equation of the line AB is

A.  $x + y = 6$

B.  $2x + y = 6$

C.  $x + 2y = 6$

D.  $3x + y = 6$

**Answer: B**



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2. The equation of the line passing through (2, 2) and having intercepts whose sum is -1 is

A.  $x - y + 1 = 0$

B.  $x - y + 7 = 0$

C.  $x - 2y + 2 = 0$  or  $2x - y - 2 = 0$

D.  $2x + 3y = 1$  or  $5x - 3y = 12$

**Answer: C**



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3. The slope of a straight line passing through A(-2, 3) is  $-4/3$ . The points on the line that are 10 unit away from A are

A. (-8, 11), (4, -5)

B.  $(-7, 9), (17, -1)$

C.  $(7, 5), (-1, -1)$

D.  $(6, 10), (3, 5)$

**Answer: A**

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4. If the lines  $14x + 7y = 44$ ,  $9x + 7y = 23$ ,  $8x + 14y = \lambda$  are concurrent, then  $\lambda =$

A. -1

B. -2

C. -7

D. 4

**Answer: D**

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5. The equation of the line passing through the point of intersection of  $x + 3y - 1 = 0$ ,  $x - 2y + 4 = 0$  and perpendicular to  $3x + 4y = 0$  is

A.  $3x + 4y - 2 = 0$

B.  $4x - 3y + 11 = 0$

C.  $4x - 3y - 11 = 0$

D.  $3x + 4y + 2 = 0$

**Answer: B**



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6. The foot of the perpendicular from  $(3, 4)$  to the line  $3x - 4y = 18$  is

A.  $(4, 4)$

B.  $(2, -3)$

C.  $(-4, 4)$

D. (6, 0)

**Answer: D**



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7. The equation of the line which is at 10 units from the origin and the normal from the origin to it makes an angle  $\frac{\pi}{4}$  with the X-axis in the negative direction is

A.  $x + y + 10\sqrt{2} = 0$

B.  $x - y - 10\sqrt{2} = 0$

C.  $x + y - 10\sqrt{2} = 0$

D.  $x - y + 10\sqrt{2} = 0$

**Answer: D**



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8. The equations of the two sides of a square whose area is 25 sq. Units are  $3x - 4y = 0$  and  $4x + 3y = 0$ . The equations of the other two sides of the square are

A.  $3x - 4y \pm 25 = 0, 4x + 3y \pm 25 = 0$

B.  $3x - 4y \pm 5 = 0, 4x + 3y \pm 5 = 0$

C.  $3x - 4y \pm 15 = 0, 4x + 3y \pm 15 = 0$

D.  $3x - 4y \pm 10 = 0, 4x + 3y \pm 10 = 0$

**Answer: A**



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9. Find the number of integer values of  $m$  for which the  $x$ -coordinate of the point of intersection of the lines  $3x + 4y = 9$  and  $y = mx + 1$  is also an integer.

A. 2

B. 0

C. 4

D. 1

**Answer: A**



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10. The vertical straight line passing through the point of intersection of the straight lines  $x - 3y + 1 = 0$ ,  $2x + 5y - 9 = 0$  and at a distance of 2 units from the origin has the equation

A.  $x - 3y + 1 = 0$

B.  $x = 2$

C.  $y = 1$

D.  $3x + 4y = 10$

**Answer: B**



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11. The foot of the perpendicular from  $(-1, 3)$  on the straight line  $5x - y - 18 = 0$  is  $(\alpha, \beta)$  then the quadratic equation in  $x$  whose roots are  $\alpha$  and  $\beta$  is

A.  $x^2 + 6x - 8 = 0$

B.  $x^2 + 6x + 8 = 0$

C.  $x^2 - 6x - 8 = 0$

D.  $x^2 - 6x + 8 = 0$

**Answer: D**



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## Exercise 1 A

1. The equation of the line passing through the point  $(2, -3)$  and parallel to the line joining the point  $(1, 2)$  and  $(-1, 5)$  is



A.  $3x + 2y = 0$

B.  $2x + 3y - 1 = 0$

C.  $x - 3y + 6 = 0$

D.  $x + 3y + 12 = 0$

**Answer: 1**



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2. The equation of the line passing through the point  $(a \cos^3 \theta, a \sin^3 \theta)$  and parallel to  $x \cos \theta - y \sin \theta = a$  is

A.  $x \cos \theta + y \sin \theta = a \cos 2\theta$

B.  $x \cos \theta - y \sin \theta = a \cos 2\theta$

C.  $x \sin \theta + y \sin \theta = a \cos 2\theta$

D. none

**Answer: 1**

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3. The equation of the line perpendicular to the line  $x = 3$  and passing through  $(-4, 2)$  is

A.  $y=2$

B.  $4x + 5y - 38 = 0$

C.  $3x - 2y = 0$

D.  $3x - 2y - 1 = 0$

**Answer: 1**

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4. The equation of the line perpendicular to the line  $2x + 3y - 5 = 0$  and passing through  $(3, -4)$  is

A.  $3x + 2y - 17 = 0$

B.  $3x - 2y + 17 = 0$

C.  $3x + 2y + 17 = 0$

D.  $3x - 2y - 17 = 0$

**Answer: 4**



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5. If  $(1, 2)$ ,  $(4, 3)$ ,  $(6, 4)$  are the midpoints of the sides  $\overline{BC}$ ,  $\overline{CA}$ ,  $\overline{AB}$  of  $\triangle ABC$ , then the equation of AB is

A.  $2x - 3y - 13 = 0$

B.  $2x + 3y - 1 = 0$

C.  $x - 3y + 6 = 0$

D.  $x + 3y + 12 = 0$

**Answer: 3**



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6. If  $(2, 1)$ ,  $(-1, -2)$ ,  $(3, 3)$  are midpoints of sides  $BC$ ,  $CA$ ,  $AB$  of  $\triangle ABC$ , then the equation of  $AB$  is

A.  $x - y = 1/2$

B.  $x + y = 1$

C.  $x - y = 9$

D.  $x = y$

**Answer: 4**



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7. Let  $PS$  be the median of the triangle with vertices  $P(2, 2)$ ,  $Q(6, -1)$  and  $R(7, 3)$ . The equation of the line passing through  $(1, -1)$  and parallel to  $PS$  is

A.  $4x + 7y + 3 = 0$

B.  $2x - 9y - 11 = 0$

C.  $4x - 7y - 11 = 0$

D.  $2x + 9y + 7 = 0$

**Answer: 4**



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8. The area of a triangle is 5 square unit. Two of its vertices are  $(2, 1)$ ,  $(3, -2)$  and the third vertex lies on the line  $y = x + 3$ . The third vertex can be

A.  $(7/2, 13/2)$

B.  $(3/2, 3/2)$

C.  $(7/2, -13/2)$

D.  $(3/2, -3/2)$

**Answer: 1**



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9. If  $t_1, t_2$  and  $t_3$  are distinct, the points  $(t_1, 2at_1 + at_1^3)$ ,  $(t_2, 2at_2 + at_2^3)$  and  $(t_3, 2at_3 + at_3^3)$  are collinear if

A.  $t_1 t_2 t_3 = 1$

B.  $t_1 + t_2 + t_3 = t_1 t_2 t_3$

C.  $t_1 + t_2 + t_3 = 0$

D.  $t_1 + t_2 + t_3 = -1$

**Answer: 3**



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10. The medians AD and BE of the triangle with vertices A(0, b), B(0, 0) and C(a, 0) are mutually perpendicular if

A.  $b = \sqrt{2}a$

B.  $a = \sqrt{2}b$

C.  $b = -\sqrt{2}a$

$$D. a = -\sqrt{b}$$

**Answer: 2**



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**11.** If  $x_1, x_2, x_3$  as well as  $y_1, y_2, y_3$  are in G.P with same common ratio, then the points  $P(x_1, y_1)$ ,  $Q(x_2, y_2)$  and  $R(x_3, y_3)$

- A. lie on a straight line
- B. lie on an ellipse
- C. lie on a circle
- D. are vartices of a triangle

**Answer: 1**



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12. The equation of the line having slope  $-\frac{4}{3}$  and x-intercept  $-\frac{2}{5}$  is

A.  $3x - 4y + 20 = 0$

B.  $2x - 3y - 14 = 0$

C.  $8x + 12y - 9 = 0$

D.  $20x + 15y + 8 = 0$

**Answer: D**



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13. The equation of the line having slope  $-\frac{2}{3}$  and y-intercept  $\frac{3}{4}$  is

A.  $3x - 4y + 20 = 0$

B.  $2x - 3y - 14 = 0$

C.  $8x + 12y - 9 = 0$

D.  $20x + 15y + 8 = 0$



**Answer: 3**



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**14.** The equation of the straight line making an intercept of 3 unit of the y-axis and inclined at  $45^\circ$  to the x-axis is

A.  $y = x - 1$

B.  $y = x + 3$

C.  $y = 45x + 3$

D.  $y = x + 45$

**Answer: 2**



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**15.** The equation of the line having inclination  $120^\circ$  and y-intercept -3 is

A.  $x + y - 5 = 0$

B.  $\sqrt{3}x + y + 3 = 0$

C.  $x + y - 2 = 0$

D.  $x - y - 5 = 0$

**Answer: 2**

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**16.** The slope of the line  $4x - 5y - 1 = 0$  is

A.  $3/2$

B.  $-3/2$

C.  $-3/4$

D.  $4/5$

**Answer: 4**

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17. The inclination of the line  $x - y + 2 = 0$  is

A.  $\pi/4$

B.  $3\pi/4$

C.  $\pi/2$

D.  $\pi/3$

**Answer: 1**



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18. Reduce the equation of the line  $8x + 6y - 15 = 0$  into slope intercept form

A.  $y = 3x + \frac{5}{3}$

B.  $y = \frac{3}{4}x + 2$

C.  $y = \frac{5}{2}x + 5$

$$D. y = -\frac{4}{3}x + \frac{5}{2}$$

**Answer: 4**



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**19.** The equation of the line having x-intercept  $-3/2$ , y-intercept  $3/4$  is

A.  $3x + 2y - 6 = 0$

B.  $2x - 4y + 3 = 0$

C.  $2x + 3y - 5 = 0$

D.  $4x - 3y - 12 = 0$

**Answer: 2**



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**20.** The intercepts of the line  $3y - 5x + 7 = 0$  are

A.  $-2, 3/2$

B.  $7/5, -7/3$

C.  $21/5, 7/2$

D.  $2, 4/3$

**Answer: 2**



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**21.** The intercepts of line joining the points  $(4, -7), (1, -5)$  are

A.  $5, 5/3$

B.  $7/5, -7/3$

C.  $5, 7/2$

D.  $-13/2, -13/3$

**Answer: 4**



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22. Reduce the equation of the line  $2x + 3y - 5 = 0$  into intercepts form

A.  $\frac{x}{7} + \frac{y}{7} = 1$

B.  $\frac{x}{-7/4} + \frac{y}{7/5} = 1$

C.  $\frac{x}{5/2} + \frac{y}{5/3} = 1$

D.  $\frac{x}{-3\sqrt{2}} + \frac{y}{-3\sqrt{2}} = 1$

Answer: 3



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23. Reduce the equation of the line  $x \cos \alpha + y \sin \alpha - p = 0$  into intercepts form

A.  $\frac{x}{p/\sin \alpha} + \frac{y}{p/\cos \alpha} = 1$

B.  $\frac{x}{p/\cos \alpha} + \frac{y}{p/\sin \alpha} = 1$

C.  $\frac{x}{p/\tan \alpha} + \frac{y}{p/\cot \alpha} = 1$

$$D. \frac{x}{p/\cot \alpha} + \frac{y}{p/\tan \alpha} = 1$$

**Answer: 2**



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**24.** The area of the triangle formed by the line  $3x + 2y + 7 = 0$  with the coordinate axes is

- A.  $25/16$  sq. unit
- B.  $49/8$  sq. unit
- C. 12 sq. unit
- D.  $49/12$  sq. unit

**Answer: 4**



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25. The area (in square units) of the triangle formed by the lines  $x = 0$ ,  $y = 0$  and  $3x + 4y = 12$  is

A. 3

B. 4

C. 6

D. 12

**Answer: 3**



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26. The area of the triangle formed by the line  $x/4 + y/6 = 1$  with the coordinate axes is

A.  $25/16$  sq. unit

B.  $49/8$  sq. unit

C. 12 sq. unit



D. 49 / 12 sq. unit

**Answer: 3**



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27. The area of the triangle formed by the line  $x \cos \alpha + y \sin \alpha = p$  with the coordinate axes is

A.  $p^2 |\sin 2\alpha|$

B.  $p^2 |\cos 2\alpha|$

C.  $p^2 |\sec 2\alpha|$

D.  $p^2 |\operatorname{cosec} 2\alpha|$

**Answer: 4**



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28. The area of the triangle formed by the line passing through the points (5, -3), (2, 6) with the coordinate axes is

- A. 24 sq. unit
- B.  $49/8$  sq. unit
- C.  $1/2$  sq. unit
- D.  $49/12$  sq. unit

**Answer: 1**



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29. The area of the triangle formed by the axes and the line  $\cos h\alpha - \sin h\alpha)x + (\cos h\alpha) + \sin h\alpha) = 2$  in sq. unit, is

- A. 4
- B. 3
- C. 2

D. 1

**Answer: 3**



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30. If the area of the triangle formed by the lines  $x = 0$ ,  $y = 0$ ,  $3x + 4y = a$  ( $a > 0$ ) is 1, then

A.  $\sqrt{6}$

B.  $2\sqrt{6}$

C.  $4\sqrt{6}$

D.  $6\sqrt{2}$

**Answer: 2**



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31. The sum of the reciprocals of intercepts made by the line  $ax + by = a + b$  on the coordinate axes is

A. 2

B. -1

C.  $\frac{a - b}{a + b}$

D. 1

**Answer: 4**



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32. The equation of the line having intercepts  $a, b$  on the axes such that  $a + b = 5, ab = 6$  is

A.  $x + y = 5$

B.  $3x + 2y - 6 = 0, 2x + 3y - 6 = 0$

C.  $x - 3y - 3 = 0, 3x - y + 3 = 0$

D.  $2x + 10y - 5 = 0$ ,  $10x + 2y - 5 = 0$

**Answer: 2**



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**33.** A line makes intercepts whose sum is 9 and product is 20. If the x-intercept is greater, then the equation of the line is

A.  $4x + 5y = 20$

B.  $5x + 4y = 20$

C.  $5x - 4y = 20$

D.  $5x + 4y = -20$

**Answer: 1**



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34. The equation of the line passing through (2, -1) and having equal intercepts is

A.  $x + y - 1 = 0$

B.  $x - y + 7 = 0$

C.  $x + y + 1 = 0$  or  $x + 4y - 2 = 0$

D.  $2x + 10y - 5 = 0, 10x + 2y - 5 = 0$

**Answer: 1**



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35. The equation of the line passing through (-4, 3) and having intercepts equal in magnitude but opposite in sign is

A.  $x - y - 5 = 0$

B.  $x - y + 5 = 0$

C.  $x + y - 1 = 0$

$$D. x - y + 7 = 0$$

**Answer: 4**



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**36.** The equation of the straight line passing through the point (4, 3) and making intercepts on the co-ordinate axes whose sum is -1 is

A.  $\frac{x}{2} + \frac{y}{3} = -1$  and  $\frac{x}{-2} + \frac{y}{1} = -1$

B.  $\frac{x}{2} - \frac{y}{3} = 1$  and  $\frac{x}{-2} + \frac{y}{1} = 1$

C.  $\frac{x}{2} + \frac{y}{3} = 1$  and  $\frac{x}{2} + \frac{y}{1} = 1$

D.  $\frac{x}{2} - \frac{y}{3} = -1$  and  $\frac{x}{-2} + \frac{y}{1} = -1$

**Answer: 2**



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37. The equation of the line passing through  $(-2, 1)$  and having intercepts whose product is 1 is

A.  $x + y - 1 = 0$

B.  $x - y + 7 = 0$

C.  $x + y + 1 = 0$  or  $x + 4y - 2 = 0$

D.  $2x + 3y = 1$  or  $9x - 10y = 75$

**Answer: 3**



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38. The equation of the line passing through  $(2, 0)$  and having intercepts whose ratio is  $m : n$  is

A.  $nx + my = m$

B.  $nx + my = 2n$

C.  $nx + my = n$



$$D. nx + my = 2m$$

**Answer: 2**



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**39.** The equation of the line passing through  $(-4, 3)$  and having intercepts whose ratio is  $5:3$  is

A.  $9x + 20y - 96 = 0$

B.  $3x + 5y = 3$

C.  $9x + 20y + 96 = 0$

D.  $9x - 20y - 96 = 0$

**Answer: 2**



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40. The equation of the line passing through the point P(1, 2) such that P bisects the part intercepted between the axes is

A.  $x + 2y = 5$

B.  $x - y + 1 = 0$

C.  $x + y - 31 = 0$

D.  $2x + y - 4 = 0$

**Answer: 4**



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41. A straight line through the point A(3, 4) is such that its intercept between the axes is bisected at A. Its equation is

A.  $4x + 3y = 24$

B.  $3x + 4y = 25$

C.  $x + y = 7$

$$D. 3x - 4y + 7 = 0$$

**Answer: 1**



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**42.** The portion of a line intercepted between the coordinate axes is bisected by the point  $(x_1, y_1)$ . The equation of the line is

A.  $\frac{x}{x_1} + \frac{y}{y_1} = 0$

B.  $\frac{x}{x_1} - \frac{y}{y_1} = 0$

C.  $\frac{x}{x_1} + \frac{y}{y_1} = 2$

D.  $\frac{x}{x_1} - \frac{y}{y_1} = 2$

**Answer: 3**



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43. The portion of a line intercepted between the coordinate axes is divided by the point  $(2, -1)$  in the ratio  $3:2$ . The equation of the line is

A.  $5x - 2y - 20 = 0$

B.  $2x - y + 7 = 0$

C.  $3x - 4y - 10 = 0$

D.  $2x + y - 4 = 0$

**Answer: 3**



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44. The equation of the line whose x-intercept is  $2/5$  and which is parallel to  $2x - 3y + 5 = 0$  is

A.  $2x - 5y + 4 = 0$

B.  $10x - 15y - 4 = 0$

C.  $28x - 21y + 12 = 0$

D.  $20x + 12y + 9 = 0$

**Answer: 2**



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**45.** The equation of the line whose y-intercept is  $-3/4$  and which is parallel to  $5x + 3y - 7 = 0$  is

A.  $2x - 5y + 4 = 0$

B.  $10x - 15y - 4 = 0$

C.  $28x - 21y + 12 = 0$

D.  $20x + 12y + 9 = 0$

**Answer: 4**



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46. The equation of the line whose x-intercept is  $-\frac{3}{7}$  and which is perpendicular to  $3x + 4y - 10 = 0$  is

A.  $2x - 5y + 4 = 0$

B.  $10x - 15y - 4 = 0$

C.  $28x - 21y + 12 = 0$

D.  $20x + 12y + 9 = 0$

**Answer: 3**

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47. The distance between the parallel lines  $5x+2y+7=0$  and  $5x + 2y + 4 = 0$  is

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48. The coordinate axes are rotated about the origin  $O$  in the counterclockwise direction through an angle  $60^\circ$ . If  $p$  and  $q$  are the intercepts made on the new axes by a straight line whose equation referred to the original axes is  $x + y = 1$  then  $1/p^2 + 1/q^2 =$

A. 2

B. 4

C. 6

D. 8

**Answer: 1**



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49. The sides of a triangle are  $3x + 2y - 6 = 0$ ,  $2x - 3y + 6 = 0$ ,  $x + 2y + 2 = 0$ .  $P(0, b)$  is a point on  $y$ -axis. If  $P$  lies on the triangle or inside the triangle then the range of  $b$  is

A.  $[-1, 3]$

B.  $[2, 3]$

C.  $[-1, 2]$

D.  $[-2, 2]$

**Answer: 3**

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**50.** A straight line through the point  $(2, 2)$  intersects the lines  $\sqrt{3}x + y = 0$  and  $\sqrt{3}x - y = 0$  at the points A and B. The equation to the line AB so that the triangle OAB is equilateral is

A.  $x - 2 = 0$

B.  $y - 2 = 0$

C.  $x + y - 4 = 0$

D. none



**Answer: 2**



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51. A straight line  $L$  is perpendicular to the line  $5x - y = 1$ . The area of the triangle formed by the line  $L$  and coordinate axes is 5. The equation of the line  $L$  is

A.  $x + 5y = \pm 5\sqrt{2}$

B.  $x + 5y = \pm 2\sqrt{5}$

C.  $5x - y = \pm 5\sqrt{2}$

D.  $5x - y = \pm 2\sqrt{5}$

**Answer: 1**



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52. Each sides of a square is of length 4 units. The centre of the square is  $(3, 7)$  and one of its diagonals is parallel to  $y = x$ . Find the co-ordinates of its vertices.

A.  $(1, 5), (1, 9), (5, 9), (5, 5)$

B.  $(2, 5), (2, 7), (4, 7), (4, 4)$

C.  $(2, 5), (2, 6), (3, 5), (3, 6)$

D. none

**Answer: 1**



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53.  $A(-1, 1), B(5, 3)$  are opposite vertices of a square. The equation of the other diagonal (not passing through A, B) of the square is

A.  $2x - 3y + 4 = 0$

B.  $2x - y + 3 = 0$

C.  $y + 3x - 8 = 0$

D.  $x + 2y - 1 = 0$

**Answer: 3**

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54.  $(-4, 5)$  is a vertex of a square and one of its diagonals is  $7x - y + 8 = 0$ . Find the equation of the other diagonal.

A.  $x + 7y - 31 = 0$

B.  $x + 7y - 15 = 0$

C.  $x + 7y + 8 = 0$

D.  $7x - y - 31 = 0$

**Answer: 1**

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55. If  $A(1, 1)$ ,  $B(\sqrt{3} + 1, 2)$  and  $C(\sqrt{3}, \sqrt{3} + 2)$  be three vertices of a square, then the diagonal through B is

A.  $y = (\sqrt{3} - 2)x + (3 - \sqrt{3})$

B.  $y = 0$

C.  $y = x$

D.  $y = (\sqrt{3} - 2)x + \sqrt{3} + 1$

**Answer: 4**



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56. In a rhombus ABCD the diagonals AC and BD intersect at the point (3, 4). If the point A is (1, 2) the diagonal BD has the equation

A.  $x - y - 1 = 0$

B.  $x + y - 1 = 0$

C.  $x - y + 1 = 0$

$$D. x + y - 7 = 0$$

**Answer: 4**



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57. Points A(1, 3) and C(5, 1) are opposite vertices of a rectangle ABCD. If the slope of BD is 2, then its equation is

A.  $2x - y = 4$

B.  $2x + y = 4$

C.  $2x + y - 7 = 0$

D.  $2x + y + 7 = 0$

**Answer: 1**



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58. If the straight lines  $y = 4 - 3x$ ,  $ay = x + 10$ ,  $2y + bx + 9 = 0$  represent the three consecutive sides of a rectangle then  $ab =$

A. 18

B. -3

C.  $1/2$

D.  $-1/3$

**Answer: 1**



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59. If the lines  $y = 4 - 3x$ ,  $ay = x + 10$ ,  $2y + bx + 9 = 0$  form three sides of the rectangle in order and the fourth side passes through  $(1, -2)$  then its equation is

A.  $x - 3y - 7 = 0$

B.  $x - 3y + 7 = 0$

C.  $x + 3y - 7 = 0$

D. none

**Answer: 1**



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**60.** One side of a rectangle lies along the line  $4x + 7y + 5 = 0$ . Two of its vertices are  $(-3, 1)$  and  $(1, 1)$ . Then the equations of the other sides are

A.  $7x - 4y + 25 = 0, 4x + 7y - 11 = 0, 7x - 4y - 3 = 0$

B.  $7x - 4y + 11 = 0, 4x + 7y - 25 = 0, 7x - 4y + 3 = 0$

C.  $7x - 4y + 2 = 0, 4x + 7y - 12 = 0, 7x - 4y - 13 = 0$

D. none

**Answer: 1**



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61. The points  $(1, 3)$  and  $(5, 1)$  are two opposite vertices of a rectangle. The other two vertices lie on the line  $y = 2x + c$ . The remaining vertices are

A.  $(2, 0), (4, 4)$

B.  $(-2, 0), (3, 4)$

C.  $(2, 0), (3, 4)$

D.  $(-2, 0), (4, 4)$

Answer: 1



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62. The points  $(1, 6)$  and  $(12, 9)$  are two opposite vertices of a parallelogram. The other two vertices lie on the line  $3y = 11x + k$ . Then

$k =$

A. 35

B. 49



C. -35

D. -49

**Answer: 4**



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**63.** The number of points  $P(x, y)$  with natural numbers as coordinates that lie inside the quadrilateral formed by the lines  $2x + y = 2$ ,  $x = 0$ ,  $y = 0$  and  $x + y = 5$  is

A. 12

B. 10

C. 6

D. 4

**Answer: 3**



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64. Let  $A(2, -3)$  and  $B(-2, 1)$  be vertices of a triangle  $ABC$ . If the centroid of this triangle moves on the line  $2x + 3y = 1$ , then the locus of the vertex  $C$  is the line

A.  $2x + 3y = 9$

B.  $3x - 2y = 3$

C.  $3x + 2y = 5$

D.  $2x - 3y = 7$

**Answer: 1**



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65.  $A(2, 3)$ ,  $B(3, -5)$  are two vertices of  $\triangle ABC$ .  $C$  is a point the line  $L \equiv 3x + 4y - 5 = 0$ . Then the locus of the centroid of  $\triangle ABC$  is a line parallel to

A.  $AB$

B. BC

C. AC

D.  $L = 0$

**Answer: 4**



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66. The equation of the line dividing the line segment joining the points (1, 1), (2, 4) in the ratio 1 : 2 and parallel to  $3x - 4y + 5 = 0$  is

A.  $x + 2y - 12 = 0$

B.  $5x - 2y - 10 = 0$

C.  $3x - 4y - 24 = 0$

D.  $3x - 4y + 4 = 0$

**Answer: 4**



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67. The equation of the line dividing the line segment joining the points (2, 5), (6, 3) in the ratio 3: 4 externally and parallel to  $x + 2y + 7 = 0$  is

A.  $x + 2y - 12 = 0$

B.  $5x - 2y - 10 = 0$

C.  $x + 2y - 24 = 0$

D.  $3x - 4y + 4 = 0$

**Answer: 1**



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68. The equation of the line dividing the line segment joining the points (2, -3), (1, 2) in the ratio 2: 3 and perpendicular to  $2x + 5y - 1 = 0$  is

A.  $x + 2y - 12 = 0$

B.  $5x - 2y - 10 = 0$

C.  $3x - 2y - 24 = 0$

D.  $5x - 2y + 4 = 0$

**Answer: 2**



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69. The equation of the line dividing the line segment joining the points  $(5, 3)$ ,  $(3, -3)$  in the ratio  $5:3$  externally and perpendicular to  $2x + 3y - 5 = 0$  is

A.  $x + 2y - 12 = 0$

B.  $5x - 2y - 10 = 0$

C.  $3x - 2y - 24 = 0$

D.  $5x - 2y + 4 = 0$

**Answer: 3**



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70. The equation of the line dividing the line segments joining two pairs of points  $(0, 0)$ ,  $(-4, 7)$  and  $(2, 3)$ ,  $(4, -5)$  in the ratio  $1:2$  and  $5:3$  respectively is

A.  $52x + 55y - 59 = 0$

B.  $52x - 55y + 59 = 0$

C.  $52x + 55y + 59 = 0$

D.  $52x - 55y - 59 = 0$

**Answer: 1**



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71. If a straight line  $L$  is perpendicular to the line  $4x - 2y = 1$  and forms a triangle of area 4 square units with the coordinate axes, then an equation of the line  $L$  is

A.  $2x + 4y + 7 = 0$

B.  $2x - 4y + 8 = 0$

C.  $2x + 4y + 8 = 0$

D.  $4x - 2y - 8 = 0$

**Answer: 3**



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72. The equation to the line parallel to  $2x + 3y - 5 = 0$  and forming an area  $4/3$  sq. unit with the coordinate axes is

A.  $2x + 3y \pm 4 = 0$

B.  $3x + 2y - 4 = 0$

C.  $3x + 2y \pm 4 = 0$

D.  $2x + 3y + 2 = 0$

**Answer: 1**



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73. If a straight line perpendicular to  $2x - 3y + 7 = 0$  forms a triangle with the coordinate axes whose area is 3 sq. units, then the equation of the straight line(s) is

A.  $3x + 2y = \pm 2$

B.  $3x + 2y = \pm 6$

C.  $3x + 2y = \pm 8$

D.  $3x + 2y = \pm 4$

**Answer: 2**



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74. The equation of a straight line, perpendicular to  $3x - 4y = 6$  and forming a triangle of area 6 square units with coordinate axes, is

A.  $4x + 3y = 12$



B.  $4x + 3y + 24 = 0$

C.  $3x + 4y = 12$

D.  $x - 2y = 6$

**Answer: 1**



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75. The line  $4x + 3y + 1 = 0$  cuts the axes at A and B. The equation to the perpendicular bisector of AB is

A.  $27x + 63y = 2$

B.  $32x - 24y = 5$

C.  $24x + 32y = 0$

D.  $72x - 96y = 7$

**Answer: 4**



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76. The perpendicular bisector of the line segment joining  $P(1, 4)$  and  $Q(k, 3)$  has y-intercept  $-4$ . Then a possible value of  $k$  is

A. 2

B.  $-2$

C.  $-4$

D. 1

**Answer: 3**



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77. The variable line  $x/a + y/b = 1$  is such that  $a + b = 10$ . The locus of the midpoint of the portion of the line intercepted between the axes is

A.  $x + y = 10$

B.  $10x + 5y = 1$

C.  $x + y = 5$

D.  $5x + 10y = 1$

**Answer: 3**



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**78.** The ends of a rod of length  $l$  move on two mutually perpendicular lines. The locus of the point on the rod which divides it in the ratio 1 : 2 is

A.  $36x^2 + 9y^2 = 4l^2$

B.  $36x^2 + 9y^2 = l^2$

C.  $9x^2 + 36y^2 = 4l^2$

D.  $9x^2 + 36y^2 = l^2$

**Answer: 3**



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79. If one vertex of an equilateral triangle of side  $a$  lies at the origin and the other lies on the line  $x = \sqrt{3}y$  then the third vertex is

- A.  $(a, 0)$
- B.  $(-a, 0)$
- C.  $(0, a)$
- D.  $(a, a)$

**Answer: 3**



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80. Two equal sides of isosceles triangle are given by equation  $7x - y + 3 = 0$  and  $x + y - 3 = 0$ . The slope of the third side is

- A.  $-3, 1/3$
- B.  $3, -1/3$
- C.  $3, 1/3$

D.  $-3, -1/3$

**Answer: 1**



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**81.** Two equal sides of an isosceles triangle are given by  $7x-y+3=0$  and  $x+y-3=0$  and the third side passes through the point  $(1,10)$  then slope  $m$  of the third side is given by

A.  $3x + y + 7 = 0$

B.  $x - 3y + 29 = 0$

C.  $3x + y + 3 = 0$

D.  $3x + y - 3 = 0$

**Answer: 4**



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82. Two equal sides of an isosceles triangle are given by  $7x-y+3=0$  and  $x+y-3=0$  and the third side passes through the point  $(1,10)$  then slope  $m$  of the third side is given by

A.  $3x + y + 7 = 0$

B.  $x - 3y + 29 = 0$

C.  $3x + y + 3 = 0$

D.  $3x + y - 3 = 0$

Answer: 1



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83. The perpendicular form of the line  $3x + 4y - 5 = 0$  is

A.  $x \cos \alpha + y \sin \alpha = 1$  where  $\cos \alpha = 3/5$ ,  $\sin \alpha = 4/5$

B.  $x \cos \alpha - y \sin \alpha = 1$  where  $\cos \alpha = 3/5$ ,  $\sin \alpha = 4/5$

C.  $x \cos \alpha + y \sin \alpha = 1$  where  $\cos \alpha = 4/5$ ,  $\sin \alpha = 3/5$

D.  $x \cos \alpha - y \sin \alpha = 1$  where  $\cos \alpha = 4/5$ ,  $\sin \alpha = 3/5$

**Answer: 1**



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**84.** The locus of the midpoint of the portion of the line  $x \cos \alpha + y \sin \alpha = p$  where  $p$  is a constant, intercepted between the axes is

A.  $p^2(x^2 + y^2) - 4x^2y^2$

B.  $p^2(x^2 + y^2) - 2x^2y^2$

C.  $4(x^2 + y^2) = p^2x^2y^2$

D.  $2(x^2 + y^2) = p^2x^2y^2$

**Answer: 1**



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85. The algebraic sum of the perpendicular distances from A, B, C to a variable line is 0. Then the line passes through

- A. orthocentre of  $\Delta ABC$
- B. centroid of  $\Delta ABC$
- C. circumcentre of  $\Delta ABC$
- D. incentre of  $\Delta ABC$

**Answer: 2**

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86. If the algebraic sum of the perpendicular distances from the points (2,0),(0,2),(4,4) to a variable line is equal to zero. Then the line passes through the point.

- A. (1, 1)
- B. (2, 1)



C. (1, 2)

D. (-1, -1)

**Answer: 1**



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**87.** A square of side "a" lies above the x-axis and has one vertex at the origin. The side passing through the origin makes an angle  $\alpha$  where  $0 < \alpha < \frac{\pi}{4}$  with the positive direction of x-axis, the equation of its diagonal not passing through the origin is

A.  $y(\cos \alpha - \sin \alpha) - x(\sin \alpha - \cos \alpha) = a$

B.  $y(\cos \alpha + \sin \alpha) + x(\sin \alpha - \cos \alpha) = a$

C.  $y(\cos \alpha + \sin \alpha) + x(\sin \alpha + \sin \alpha) = a$

D.  $y(\cos \alpha + \sin \alpha) + x(\cos \alpha - \sin \alpha) = a$

**Answer: 4**



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88. The distance of the point  $(2,3)$  from the line  $2x - 3y + 9 = 0$  measured along a line  $x - y + 1 = 0$  is

A.  $\sqrt{2}$

B. 2

C.  $2\sqrt{2}$

D.  $4\sqrt{2}$

Answer: 4



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89. The distance of the line  $3x - y = 0$  from the point  $(4,1)$  measured along a line making an angle  $135^\circ$  with the x-axis is

A. 0

B.  $13\sqrt{2}/2$

C.  $11\sqrt{2}/4$

D.  $7\sqrt{2}/5$

**Answer: 3**



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**90.** A line through  $(2, 3)$  makes an angle  $\pi/4$  with the positive direction of x-axis. The length of the line segment between  $(2, 3)$  and the line  $x + y - 7 = 0$  is

A. 1

B. 2

C.  $\sqrt{2}$

D.  $2\sqrt{2}$

**Answer: 3**

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91. If the straight line through the point  $P(3,4)$  makes an angle  $\pi/6$  with the x-axis in the positive direction and meets the line  $3x + 5y + 1 = 0$  at  $Q$  the length  $PQ$  is

A. 30

B.  $30(\sqrt{3} - 1)$

C.  $\sqrt{3} - 1$

D.  $15(3\sqrt{30} - 5\sqrt{10})$

**Answer: 4**

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92. The distance between the parallel lines  $4x + 3y + 7 = 0$ ,  $12x + 9y + 1 = 0$  is

A.  $\frac{2}{3}$

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

C.  $\frac{29}{4\sqrt{13}}$

D.  $\frac{9}{2\sqrt{5}}$

**Answer: 2**



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**93.** The distance between the parallel lines

$$2x - y + 3 = 0, 2x - y - 4 = 0$$
 is



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**94.** The line L given by  $\frac{x}{5} + \frac{y}{b} = 1$  passes through the point (13,32). The

line K is parallel to L and has the equation  $\frac{x}{c} + \frac{y}{3} = 1$ . Then the

distance between L and K is

A.  $\frac{23}{\sqrt{15}}$

B.  $\frac{c}{\sqrt{17}}$

C.  $\frac{17}{\sqrt{15}}$

D.  $\frac{23}{\sqrt{17}}$

**Answer: 4**



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**95.** The area (in square units) of the circle which touches the lines

$4x + 3y = 15$  and  $4x + 3y = 5$  is

A.  $4\pi$

B.  $3\pi$

C.  $2\pi$

D.  $\pi$

**Answer: 4**

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96. The lines  $x + 2y - 3 = 0$ ,  $x + 2y + 7 = 0$ ,  $2x - y - 4 = 0$  form three sides of two squares. The equation of the fourth side is

A.  $2x - y - 14 = 0$  or  $2x - y + 6 = 0$

B.  $2x - y - 8 = 0$  or  $2x - y + 16 = 0$

C.  $x - 2y - 14 = 0$  or  $x - 2y + 6 = 0$

D.  $x + 2y - 14 = 0$  or  $x + 2y + 6 = 0$

**Answer: 1**

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97. The vertices of a triangle are  $O(0, 0)$ ,  $B(-3, -1)$ ,  $C(-1, -3)$ . The equation of the line parallel to  $BC$  and intersecting the sides  $OB$  and  $OC$  whose perpendicular distance from  $O$  is  $1/2$  is

A.  $x + y = 1/\sqrt{2}$

B.  $x + y = -1/\sqrt{2}$

C.  $x + y = -1/2$

D.  $x + y = 1/2$

**Answer: 2**



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**98.** The point on the line  $x + y + 3 = 0$  whose distance from  $x + 2y + 2 = 0$  is  $\sqrt{5}$  is

A. (6, 9)

B. (-6, 9)

C. (9, 6)

D. (-9, 6)

**Answer: 4**



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99. If  $p_1, p_2$  are the perpendicular distance from the origin to the two perpendicular to each other, then the locus of the point of intersection of the perpendicular lines is

A.  $x^2 + y^2 = p_1^2 + p_2^2$

B.  $x + y = p_1 + p_2$

C.  $x^2 - y^2 = p_1^2 - p_2^2$

D.  $x - y = p_1 - p_2$

**Answer: 1**

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100. The slope of a straight line passing through  $A(5, 4)$  is  $-5/12$ . The points on the line that are 13 unit away from A are

A.  $(-8, 11), (4, -5)$

B.  $(-7, 9), (17, -1)$

C.  $(7, 5), (-1, 1)$

D.  $(6, 10), (3, 5)$

**Answer: 2**



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**101.** A line passing through  $A(1, -2)$  has slope 1. The points on the line at a distance of  $4\sqrt{2}$  unit from A are

A.  $(3, -6)(5, 2)$

B.  $(-3, -6), (5, -2)$

C.  $(-3, -6), (5, 2)$

D.  $(3, 6), (-5, 2)$

**Answer: 3**

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**102.** A line is drawn through  $P(3, 4)$  inclined at an angle  $3\frac{\pi}{4}$  with x-axis.

The points on the line on opposite sides of  $P$  at distance  $\sqrt{2}$  from, it are

A.  $(2, 5), (4, 3)$

B.  $(-2, -5), (-4, -3)$

C.  $(2, 5), (-4, -3)$

D. none

**Answer: 1**

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**103.** A line which makes an acute angle  $\theta$  with the positive direction of the x-axis is drawn through the point  $P(3,4)$  to meet the line  $x=6$  at  $R$  and  $y=8$  at  $S$ . Then.

A.  $r^2 \sin^2 \theta + 4r(2 \sin \theta + \cos \theta) + 4 = 0$

B.  $r^2 \sin^2 \theta + 4r(2 \sin \theta - \cos \theta) + 4 = 0$

C.  $r^2 \sin^2 \theta - 4r(2 \sin \theta + \cos \theta) + 4 = 0$

D.  $r^2 \sin^2 \theta - 4r(2 \sin \theta - \cos \theta) + 4 = 0$

**Answer: 2**



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**104.** The ratio in which the line  $y = x$  divides the segment joining  $(2, 3)$  and  $(8, 6)$  is

A.  $1:2$

B.  $1: -2$

C.  $1:3$

D.  $1: -3$

**Answer: 1**

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**105.** The ratio in which the line  $3x - 4y + 5 = 0$  divides the line segment joining the points  $(2, -4), (-3, 1)$  is

A. 26:9

B. 27:8

C. 24:7

D. 22:6

**Answer: 2**

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**106.** The ratio in which the line joining the points  $A(-1, -1)$  and  $B(2, 1)$  divides the line joining  $C(3, 4)$  and  $D(1, 2)$  is

A. 7:5 internally

B. 7: 5 externally

C. 7: 11 internally

D. 7: 11 externally

**Answer: 2**



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**107.** If  $A(2, -1)$  and  $B(6, 5)$  are two points the ratio in which the foot of the perpendicular from  $(4, 1)$  to  $AB$  divides it is

A. 8: 15

B. 5: 8

C.  $-5: 8$

D.  $-8: 5$

**Answer: 2**



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108. Let  $2x - 3y + 1 = 0$  be a line. The points  $(3, 4)$ ,  $(1, 2)$  lie in

- A. same side of the line
- B. origin side of the line
- C. opposite sides of the line
- D. none

**Answer: 1**



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109. If the line  $3x + 4y = 8$  is denoted by L, then the points  $(3, -5)$ ,  $(-5, 2)$

- A. lie on L
- B. lie on the same side of L
- C. lie on opposite sides of L
- D. are equidistant from L

**Answer: 2**



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**110.** Which of the following sets of points lie on the negative side, and on the positive side respectively of the line  $x - \sqrt{3}y + 1 = 0$ ?

A.  $(3, \sqrt{3}), (3, 3\sqrt{3})$

B.  $(3\sqrt{3}, 3), (3, \sqrt{3})$

C.  $(3, \sqrt{3}), (\sqrt{3}, \sqrt{3})$

D.  $(3, 3\sqrt{3}), (3, \sqrt{3})$

**Answer: 4**



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**111.** Let O be the origin A(3, -2), B(1, 2) and C(1, 1). The pair of points which are on different sides of the line  $2x + 3y = 5$  are



A. A, B

B. A, C

C. B, C

D. none

**Answer: 1**



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**112.** If the points (1, 2) and (3, 4) were to be on the same side of the line

$3x - 5y + a = 0$  then

A.  $7 < a < 11$

B.  $a = 7$

C.  $a = 11$

D.  $a < 7$  or  $a > 11$

**Answer: 4**

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113. The range of  $\theta$  in  $(0, \pi)$  such that the point  $(3, 5)$  and  $(\sin \theta, \cos \theta)$  lie on the same side of the line  $x + y - 1 = 0$  is

A.  $(0, \pi/4)$

B.  $(0, \pi/2)$

C.  $(\pi/4, 3\pi/4)$

D.  $(\pi/2, 3\pi/4)$

**Answer: 2**

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114. The line segment joining the points  $(1, 2)$  and  $(k, 1)$  is divided by the line  $3x + 4y - 7 = 0$  in the ratio  $4:9$ , then  $k$  is

A. 2

B. -2

C. 3

D. -3

**Answer: 2**



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**115.** If the line  $2x + y = k$  passes through the point which divides the line segment joining the points (1, 1) and (2, 4) in the ratio 3:2 then k equals

A. 6

B.  $\frac{11}{5}$

C.  $29/5$

D. 5

**Answer: 1**



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**116.** The vertices of a triangle are  $(2, 4)$ ,  $(4, -2)$ ,  $(-3, -6)$ . Then the origin lies

- A. inside the triangle
- B. outside the triangle
- C. on one of the triangle
- D. none

**Answer: 3**



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**117.** Let  $ABC$  be a triangle. If  $P$  is a point such that  $AP$  divides  $BC$  in the ratio  $2:3$ ,  $BP$  divides  $CA$  in the ratio  $3:5$  then the ratio in which  $CP$  divides  $AB$  is

- A.  $2:5$

B. 2: - 5

C. 5: 2

D. 5: - 2

**Answer: 3**



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**118.** A line L cuts the sides AB, BC of  $\triangle ABC$  in the ratio 2:5, 7:4 respectively then the line L cuts CA in the ratio

A. 7: 10

B. 7: - 10

C. 10: 7

D. 10: - 7

**Answer: 4**



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119. A straight line through the origin  $O$  meets the parallel lines  $4x + 2y = 9$  and  $2x + y + 6 = 0$  at points  $P$  and  $Q$  respectively. Then the point  $O$  divides the segment  $PQ$  in the ratio

A. 1:2

B. 3:4

C. 2:1

D. 4:3

**Answer: 2**



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### Exercise 1 B

1. The point of intersection of the straight lines  $2x + 3y + 4 = 0$ ,  $6x - y + 12 = 0$  is

A. (2, -3)

B. (-2, 0)

C. (-2, -1)

D. (-2, 1)

**Answer: B**



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2. The point of intersection of the diagonals of the quadrilateral with vertices (1, 2), (3, -4), (2, 1), (-1, -2) is

A.  $(\frac{7}{5}, \frac{8}{5})$

B.  $(\frac{5}{7}, \frac{5}{8})$

C.  $(-\frac{7}{5}, \frac{8}{5})$

D.  $(-\frac{5}{7}, -\frac{8}{7})$

**Answer: A**

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3. If  $a, b, c$  form a GP with common ratio  $r$ , the sum of the ordinates of the points of intersection of the line  $ax+by+c=0$  and the curve  $x + 2y^2 = 0$  is

A.  $-\frac{r^2}{2}$

B.  $-\frac{r}{2}$

C.  $\frac{r}{2}$

D.  $r$

**Answer: C**

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4. If the lines  $7x + 2y - 8 = 0$ ,  $2x + y - 1 = 0$ ,  $3x + 4y + 6 = 0$  are concurrent, then the point of concurrence is

A.  $(2, -3)$



B. (6, 11)

C.  $(78/47, -181/47)$

D.  $(-13/5, 2/5)$

**Answer: A**



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5. The lines  $x - y - 2 = 0$ ,  $x + y - 4 = 0$  and  $x + 3y = 6$  meet in the common point

A. (1, 2)

B. (2, 2)

C. (3, 1)

D. (1, 1)

**Answer: C**



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6. The lines  $2x + y - 1 = 0$ ,  $ax + 3y - 3 = 0$ ,  $3x + 2y - 2 = 0$  are concurrent

A. for all a

B. for a = 4 only

C. for  $-1 \leq a \leq 3$

D. for  $a > 0$  only

**Answer: A**



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7. If the lines  $3x + y + 2 = 0$ ,  $2x - y + 3 = 0$ ,  $2x + ay - 6 = 0$  are concurrent then a =

A. 2

B. 4

C. 6

D. 8

**Answer: D**



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8. If the lines  $4x + 3y - 1 = 0$ ,  $x - y + 5 = 0$  and  $kx + 5y - 3 = 0$  are concurrent, then  $k =$

A. 4

B. 5

C. 6

D. 7

**Answer: C**



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9. The value of  $k$  such that the lines  $2x - 3y + k = 0$ ,  $3x - 4y - 13 = 0$  and  $8x - 11y - 33 = 0$  are concurrent, is

A. 20

B. -7

C. 7

D. -20

Answer: B



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10. The condition that the lines  $ax + hy + g = 0$ ,  $hx + by + f = 0$ ,  $gx + fy + c = 0$  to be concurrent is

A.  $a + b + c = 0$ ,  $f + g + h = 0$

B.  $a + b + c = f + g + h$

C.  $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

D.  $(a + b + c)(f + g + h) = 0$

**Answer: C**



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11. The condition that the three different lines  $ax + by + c = 0$ ,  $bx + cy + a = 0$ ,  $cx + ay + b = 0$  to be concurrent is

A.  $a = b = c$

B.  $a + b + c = 0$

C.  $a + b + c = 0, a = b = c$

D.  $a + b + c = 0$  or  $a = b = c$

**Answer: B**



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12. If  $a \neq b \neq c$  and if  $ax + by + c = 0$ ,  $bx + cy + a = 0$ ,  $cx + ay + b = 0$  are concurrent then  $2^{a^2b^{-1}c^{-1}} \cdot 2^{b^2c^{-1}a^{-1}} \cdot 2^{c^2a^{-1}b^{-1}} =$

A. 8

B. 0

C. 2

D. none

**Answer: A**



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13. The condition that the lines

$y = m_1x + c_1$ ,  $y = m_2x + c_2$ ,  $y = m_3x + c_3$  are concurrent is

A.  $m_1(c_2 - c_3) + m_2(c_3 - c_1) + m_3(c_1 - c_2) = 0$

B.  $m_1 + m_2 + m_3 = 0$

C.  $m_1c_2 - m_2c_3 + c_2m_3 = 0$

D. none

**Answer: C**



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14. If  $t_1 \neq t_2 \neq t_3$  and the lines  $t_1x + y = 2at_1 + at_1^3$ ,  $t_2x + y = 2at_2 + at_2^3$ ,  $t_3x + y = 2at_3 + at_3^3$  are concurrent then  $t_1 + t_2 + t_3$  is

A. 0

B. -1

C. 1

D. none

**Answer: A**



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15. The equation  $(b - c)x + (c - a)y + a - b = 0$  and  $(b^3 - c^3)x + (c^3 - a^3)y + a^3 - b^3 = 0$  will represent the same line if

A.  $a = b = c$

B.  $a + b + c = 0$

C.  $a/b = c/a$

D. none

**Answer: B**

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16. If the straight lines  $ax + by + c = 0$  and  $x \cos \alpha + y \sin \alpha = c$ , enclose an angle  $\pi/4$  between them and meet the straight line  $x \sin \alpha - y \cos \alpha = 0$  in the same point, then

A.  $a^2 + b^2 = c^2$



B.  $a^2 + b^2 = 2$

C.  $a^2 + b^2 = 2c^2$

D.  $a^2 + b^2 = 4$

**Answer: B**



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17. If the point of intersection of  $kx + 4y + 2 = 0$ ,  $x - 3y + 5 = 0$  lies on  $2x + 7y - 3 = 0$  then  $k =$

A. 2

B. 3

C. -2

D. -3

**Answer: B**



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18. If the lines  $x + 2ay + a = 0$ ,  $x + 3by + b = 0$ ,  $x + 4cy + c = 0$  are concurrent, then a, b, c are in

A. A.P

B. G.P

C. H.P

D. A.G.P

**Answer: C**



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19. If the lines  $2x - ay + 1 = 0$ ,  $3x - by + 1 = 0$ ,  $4x - cy + 1 = 0$  are concurrent, then a, b, c are in

A. A.P

B. G.P

C. H.P

D. A.G.P

**Answer: A**



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20. If the lines  $x + ay = a = 0$ ,  $bx + y + b = 0$ ,  $cx + cy + 1 = 0$  ( $a, b, c$  being distinct and  $\neq 1$ ) are concurrent, then the value of

$$\left( \frac{a}{a-1} + \frac{b}{b-1} + \frac{c}{c-1} \right) \text{ is}$$

A. -1

B. 0

C. 1

D. none

**Answer: C**



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21. The straight lines  $x + 2y - 9 = 0$ ,  $3x + 5y - 5 = 0$ ,  $ax + by + 1 = 0$  are concurrent if the line  $22x - 35y + 1 = 0$  passes through the point

A. (a, b)

B. (b, a)

C. (-a, b)

D. (a, -b)

**Answer: B**



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22. The equation of the line passing through the point of intersection of the lines  $2x + 3y - 4 = 0$ ,  $3x - y + 5 = 0$  and the origin is

A.  $2x + y = 0$

B.  $2x + 3y - 4 = 0$

C.  $x + 2y + 1 = 0$

D.  $2x + y - 12 = 0$

**Answer: A**



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**23.** The equation of the line passing through the point of intersection of the lines  $2x + y + 1 = 0$ ,  $x - y - 7 = 0$  and the point  $(3, -2)$  is

A.  $3x + y = 0$

B.  $3x + y - 5 = 0$

C.  $5x + 2y = 0$

D.  $3x - y - 11 = 0$

**Answer: D**



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24. The equation of the line passing through the point of intersection of  $2x + 3y = 1$ ,  $3x + 4y = 6$  and parallel to  $5x - 2y = 7$  is

A.  $5x - 2y - 88 = 0$

B.  $4x + 3y + 3 = 0$

C.  $x - 2y = 0$

D.  $2x + y - 5 = 0$

**Answer: A**



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25. The equation of the line passing through the point of intersection of  $5x - 2y = 12$ ,  $4x - 7y - 15 = 0$  and parallel to  $3x - 2y + 5 = 0$  is

A.  $3x + 2y - 8 = 0$

B.  $3x - 2y + 8 = 0$

C.  $3x - 2y - 8 = 0$

D.  $3x + 2y + 8 = 0$

**Answer: C**



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**26.** The equation of the line passing through the intersection of the lines,  $x - 2y + 5 = 0$  and  $3x + 2y + 7 = 0$  and perpendicular to the line  $x - y = 0$  is

A.  $x + y = 0$

B.  $x + y = 2$

C.  $x + y + 2 = 0$

D.  $x + y + 1 = 0$

**Answer: C**



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27. The equation of the straight line perpendicular to  $5x - 2y = 7$  and passing through the point of intersection of the lines  $2x + 3y = 1$  and  $3x + 4y = 6$  is

A.  $2x + 5y + 17 = 0$

B.  $2x + 5y - 17 = 0$

C.  $2x - 5y + 17 = 0$

D.  $2x - 5y = 17$

**Answer: A**



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28. The equation of the line passing through the point of intersection of the lines  $x - 3y + 2 = 0$  and  $2x + 5y - 7 = 0$  and perpendicular to the line  $3x + 2y + 5 = 0$  is

A.  $2x - 3y + 1 = 0$



B.  $6x - 9y + 11 = 0$

C.  $2x - 3y - 5 = 0$

D.  $3x + 2y + 1 = 0$

**Answer: A**



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**29.** The equation of the straight line perpendicular to the straight line  $3x + 2y = 0$  and passing through the point of intersection of the lines  $x + 3y - 1 = 0$  and  $x - 2y + 4 = 0$  is

A.  $2x - 3y + 1 = 0$

B.  $2x - 3y + 3 = 0$

C.  $2x - 3y + 5 = 0$

D.  $2x - 3y + 7 = 0$

**Answer: D**

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30. The equation of the line passing through the point of the intersection of the lines  $x + y - 5 = 0$ ,  $2x - y + 4 = 0$  and having intercepts numerically equal is

A.  $x + y - 5 = 0$  or  $3x - 3y + 13 = 0$

B.  $x - y - 5 = 0$  or  $3x - 3y + 13 = 0$

C.  $x + y - 5 = 0$  or  $3x + 3y + 13 = 0$

D.  $x + y + 5 = 0$  or  $3x - 3y - 13 = 0$

**Answer: A**

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31. The equation of the straight line passing through the intersection of  $x + 2y - 19 = 0$ ,  $x - 2y - 3 = 0$  and at a distance of 5 unit from  $(-2, 4)$  is

A.  $5x - 12y - 7 = 0$

B.  $5x + 12y + 103 = 0$

C.  $5x - 12y + 7 = 0$

D.  $12x - 5y + 7 = 0$

**Answer: A**

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**32.** The perpendicular distance of the straight line  $7x + 24y = 15$  from the point of intersection of the lines  $3x + 2y + 4 = 0$ ,  $2x + 5y - 1 = 0$  is

A.  $1/2$  unit

B.  $1/5$  unit

C.  $2/3$  unit

D.  $3/4$  unit

**Answer: B**



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**33.** The vertical straight line passing through the point of intersection of the straight lines  $x - 3y + 1 = 0$ ,  $2x + 5y - 9 = 0$  and at a distance of 2 units from the origin has the equation

A.  $x = 2$

B.  $3x + 4y - 10 = 0$

C.  $y = 1$

D. none

**Answer: B**



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34. The locus of the point of intersection of the lines  $x \cos \alpha + y \sin \alpha = a$  and  $x \sin \alpha - y \cos \alpha = b$ , where  $\alpha$  is a parameter is

A.  $x^2 - y^2 = a^2 + b^2$

B.  $x^2 + y^2 = a^2 + b^2$

C.  $x^2 + y^2 = a^2 - b^2$

D.  $x^2 - y^2 = a^2 - b^2$

**Answer: B**



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35. A variable line drawn through the point of intersection of the lines  $\frac{x}{a} + \frac{y}{b} = 1$ ,  $\frac{x}{b} + \frac{y}{a} = 1$  meets the coordinate axes in A and B. Then the locus of midpoint of AB is

A.  $2xy(a + b) = ab(x + y)$

B.  $xy(a + b) = ab(x + y)$

C.  $2xy(a + b) = ab(x - y)$

D.  $xy(a + b) = ab(x - y)$

**Answer: A**



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**36.** Let  $a$  and  $b$  be nonzero reals such that  $a \neq b$ . Then the equation of the line passing through the origin and the point of intersection of  $x/a + y/b = 1$  and  $x/b + y/a = 1$  is

A.  $ax + by = 0$

B.  $bx + ay = 0$

C.  $y - x = 0$

D.  $x + y = 0$

**Answer: C**

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37. The equation to the line passing through the intersection of

$$\frac{x}{b} + \frac{y}{b} = 1, \frac{x}{b} + \frac{y}{a} = 1 \text{ where } ab = a + b \text{ and } (1, 2) \text{ is}$$

A.  $x = 1$

B.  $x = 2$

C.  $y = 1$

D.  $y = 2$

**Answer: A**

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38. A straight line which makes equal intercepts on positive X and Y axes and which is at a distance 1 unit from the origin intersects the straight line  $y = 2x + 3$  at  $(x_0, y_0)$ . Then  $2x_0 + y_0 =$

A.  $3 + \sqrt{2}$

B.  $\sqrt{2} - 1$

C. 1

D. 0

**Answer: B**



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**39.** The point of concurrence of the lines

$$(3k + 1)x - (2k + 3)y + (9 - k) = 0 \text{ is}$$

A. (1, 1)

B. (1, -1)

C. (3, 4)

D. (-2, 1)

**Answer: C**



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40. The point of concurrence of the lines

$$(a + 2b)x + (a - b)y + (a + 5b) = 0 \text{ is}$$

A. (-1, 2)

B. (2, -1)

C. (-2, 1)

D. (1, -2)

**Answer: C**

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41. The point of concurrence of the lines

$$(2a + 5b)x + (3a - 2b)y - 5a - 3b = 0 \text{ is}$$

A. (1, 1)

B. (1, -1)

C. (2, 2)

D. (-2, 2)

**Answer: A**



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42. If ' $\theta$ ' is the parameter, then the family of lines  $(2 \cos \theta + 3 \sin \theta)x + (3 \cos \theta - 5 \sin \theta)y - (5 \cos \theta - 2 \sin \theta) = 0$  pass through the fixed point

A. (0, 0)

B. (1, 1)

C. (0, 1)

D. (1, 0)

**Answer: B**



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43. If  $a, b, c$  are in A.P, the lines  $ax + by + c = 0$  pass through the fixed point

A. (1, 2)

B. (-1, 2)

C. (1, -2)

D. (-1, -2)

**Answer: C**



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44. If  $a, b, c$  are in A.P, then the lines  $ax + by + c = 0$

A. pass through a fixed point

B. form an equilateral triangle

C. form a rhombus

D. form a square

**Answer: A**



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**45.** If  $3a + 2b + 4c = 0$  then the lines  $ax + by + c = 0$  pass through the fixed point

A.  $(\frac{3}{4}, \frac{1}{2})$

B.  $(-\frac{3}{4}, \frac{1}{2})$

C.  $(\frac{3}{4}, -\frac{1}{2})$

D.  $(-\frac{3}{4}, -\frac{1}{2})$

**Answer: A**



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46. If  $4a^2 + 9b^2 - c^2 + 12ab = 0$ , then the set of lines  $ax + by + c = 0$  pass through the fixed point

A.  $(1, 2), (-1, -2)$

B.  $(2, 3), (-2, -3)$

C.  $(2, -3), (-2, 3)$

D.  $(1, -2), (-1, 2)$

**Answer: B**



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47.  $k$  is a nonzero constant. If  $k = \frac{a+b}{ab}$  then the straight line  $\frac{x}{a} + \frac{y}{b} = 1$  passes through the point

A.  $(k, k)$

B.  $(1/k, 1/k)$

C.  $(1, 1)$

D.  $(k, 1/k)$

**Answer: B**



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**48.** The equations of the sides  $\overline{BC}$ ,  $\overline{CA}$ ,  $\overline{AB}$  of a triangle ABC are  $u_1 = a_1x + b_1y + c_1 = 0$ ,  $u_2 = a_2x + b_2y + c_2 = 0$  and  $u_3 = a_3x + b_3y + c_3 = 0$  respectively. The equation of the line parallel to  $\overline{BC}$  and passing through A is

A.  $(a_3b + a_1b_3)u_2 = (a_2b_1 - a_1b_2)u_3$

B.  $(a_3b_1 - a_1b_3)u_2 = (a_2b_1 + a_1b_2)u_3$

C.  $(a_3b_1 + a_1b_3)u_2 = (a_2b_1 + a_1b_2)u_3$

D.  $(a_3b_1 - a_1b_3)u_2 = (a_2b_1 - a_1b_2)u_3$

**Answer: D**



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49. The lines  $2x + 3y = 6$ ,  $2x + 3y = 8$  cut the X-axis at A, B respectively. A line  $l$  drawn through the point  $(2, 2)$  meets the X-axis at C in such a way that abscissae of A, B and C are in arithmetic progression. Then the equation of the line  $l$  is

A.  $2x + 3y = 10$

B.  $3x + 2y = 10$

C.  $2x - 3y = 10$

D.  $3x - 2y = 10$

**Answer: A**



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50. The number of lines that can be drawn through the point  $(-3, 4)$  at a distance of 5 units from the point  $(2, -8)$  is

A. 0

B. 1

C. 2

D. infinite

**Answer: C**



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51. The number of lines that can be drawn through the point  $(5,2)$  at a distance of 5 units from the point  $(2,-2)$  is

A. 0

B. 1

C. 2

D. infinite

**Answer: B**



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52. The number of lines that can be drawn through the point  $(4, \sqrt{13})$  at a distance of 3 units from the point  $(-2, 0)$  is

- A. 0
- B. 1
- C. 2
- D. infinite

**Answer: C**



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53. The number of lines that can be drawn through the point  $(4, -5)$  at a distance of 10 units from the point  $(1, 3)$  is

- A. 0
- B. 1

C. 2

D. infinite

**Answer: A**



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54. The centroid of the triangle formed by the lines  $x + y - 1 = 0$ ,  $x - y - 1 = 0$ ,  $x - 3y + 3 = 0$  is

A.  $(4/3, 1)$

B.  $(-4/3, 1)$

C.  $(8/3, 3)$

D.  $(-8/3, 3)$

**Answer: A**



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55. The point on the line  $2x - 3y = 5$  which is equidistant from  $(1, 2)$  and  $(3, 4)$  is

A.  $(-2, 2)$

B.  $(4, 1)$

C.  $(1, -1)$

D.  $(4, 6)$

**Answer: B**



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56. The point on the line  $3x + 4y = 5$  which is equidistant from  $(1, 2)$  and  $(3, 4)$  is :

A.  $(7, -4)$

B.  $(15, -10)$

C.  $(1/7, 8/7)$

D.  $(0, 5/4)$

**Answer: B**



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57. Let  $a, b, c$  and  $d$  be non-zero numbers. If the point of intersection of the lines  $4ax + 2ay + c = 0$  and  $5bx + 2by + d = 0$  lies in the fourth quadrant and is equidistant from the two axes then

A.  $3bc - 2ad = 0$

B.  $3bc + 2ad = 0$

C.  $2bc - 3ad = 0$

D.  $2bc + 3ad = 0$

**Answer: A**



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58. The circumcentre of a triangle with vertices  $(-2, 3)$ ,  $(2, -1)$ ,  $(4, 0)$  is

A.  $\left(\frac{3}{2}, \frac{5}{2}\right)$

B.  $\left(\frac{3}{2}, -\frac{5}{2}\right)$

C.  $\left(-\frac{3}{2}, \frac{5}{2}\right)$

D.  $\left(-\frac{3}{2}, -\frac{5}{2}\right)$

**Answer: A**



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59. The circumcentre of the triangle passing through

$(1, \sqrt{3})$ ,  $(1, -\sqrt{3})$ ,  $(3, -\sqrt{3})$  is

A.  $(2, 0)$

B.  $(1, 0)$

C.  $(2, \sqrt{3})$

D.  $(0, 2)$

**Answer: A**



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**60.** Find the circumcentre of the triangle whose sides are

$$3x - y - 5 = 0, x + 2y - 4 = 0 \text{ and } 5x + 3y + 1 = 0.$$

A.  $\left(\frac{6}{7}, \frac{2}{7}\right)$

B.  $\left(\frac{6}{7}, -\frac{2}{7}\right)$

C.  $\left(-\frac{6}{7}, \frac{2}{7}\right)$

D.  $\left(-\frac{6}{7}, -\frac{2}{7}\right)$

**Answer: C**



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**61.** The circumcentre of the triangle formed by the lines

$$3x - y - 5 = 0, x + 3y - 5 = 0, x = y \text{ is}$$

A. (2, 1)

B. (5/2, 5/2)

C. (5/4, 5/4)

D. (15/8, 15/8)

**Answer: D**



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**62.** The incentre and excentres of the triangle formed by the lines

$x = 0, y = 0, 3x + 4y = 2$  are

A. (0, 2),  $(-2\sqrt{3}, 0)$ , (0, 6),  $(2\sqrt{3}, 0)$

B. (1, 8), (15, 120), (40, -5),  $(-24, 3)$

C. (1, 1), (3, -3), (6, 6),  $(-2, 2)$

D.  $(-2, 2)$ , (1, 8), (0, 6),  $(2\sqrt{3}, 0)$

**Answer: C**

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63. The incentre and excentres of the triangle formed by the lines

$$3x + 4y = 0, 5x - 12y = 0, y = 15 \text{ are}$$

A.  $(0, 2), (-2\sqrt{3}, 0), (0, 6), (2\sqrt{3}, 0)$

B.  $(1, 8), (15, 120), (40, -5), (-24, 3)$

C.  $(1, 1), (3, -3), (6, 6), (-2, 2)$

D.  $(-2, 2), (1, 8), (0, 6), (2\sqrt{3}, 0)$

**Answer: B**

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64. The incentre of the triangle formed by the lines

$$x + y = 1, x = 1, y = 1 \text{ is}$$

A.  $\left(1 - \frac{1}{\sqrt{2}}, 1 - \frac{1}{\sqrt{2}}\right)$



B.  $\left(1 - \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

C.  $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

D.  $\left(\frac{1}{\sqrt{2}}, 1 - \frac{1}{\sqrt{2}}\right)$

**Answer: C**



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65. The point equidistant to the lines

$$4x + 3y + 10 = 0, 5x - 12y + 26 = 0, 7x + 24y - 50 = 10 \text{ is}$$

A. (1, -1)

B. (1, 1)

C. (0, 0)

D. (0, 1)

**Answer: C**



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66. The orthocentre of the triangle formed by  $(1, 0)$ ,  $(2, -4)$ ,  $(-5, -2)$  is

A.  $\left(\frac{11}{13}, \frac{7}{13}\right)$

B.  $\left(\frac{11}{13}, -\frac{7}{13}\right)$

C.  $\left(-\frac{11}{13}, \frac{7}{13}\right)$

D.  $\left(-\frac{11}{13}, -\frac{7}{13}\right)$

**Answer: B**



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67. The orthocentre of the triangle formed by  $(0, 0)$ ,  $(3, 1)$ ,  $(1, 3)$  is

A.  $(3/2, 3/2)$

B.  $(2/5, 3/5)$

C.  $(4, 8/3)$

D. (24, - 26)

**Answer: A**



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**68.** The orthocentre of the triangle formed by (1,-3),(6,1),(4,-1) is

A.  $(\frac{3}{2}, \frac{3}{2})$

B. (-3, 2)

C.  $(4, \frac{8}{3})$

D. (24, -26)

**Answer: D**



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69. The orthocentre of the triangle formed by  $(2, -1/2)$ ,  $(1/2, -1/2)$  and  $(2, (\sqrt{3} - 1)/2)$  is

A.  $\left(\frac{3}{2}, \frac{\sqrt{3} - 3}{6}\right)$

B.  $\left(2, -\frac{1}{2}\right)$

C.  $\left(\frac{5}{4}, \frac{\sqrt{3} - 2}{4}\right)$

D.  $\left(\frac{1}{2}, -\frac{1}{2}\right)$

**Answer: B**



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70. The orthocentre of the triangle formed by the lines  $x - 2y + 9 = 0$ ,  $x + y - 9 = 0$ ,  $2x - y - 9 = 0$  is

A. (5, 5)

B. (5, -5)

C. (-5, 5)

D. (-5, -5)

**Answer: A**



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71. The orthocentre of the triangle formed by the lines  $x + y = 6$ ,  $2x + y = 4$ ,  $x + 2y = 5$  is

A. (11, 10)

B. (11, -10)

C. (-11, 10)

D. (-11, -10)

**Answer: D**



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72. Find the orthocentre of the triangle whose sides are

$$4x - 7y + 10 = 0, x + y = 6 \text{ and } 7x + 4y = 15$$

A. (1, 2)

B. (1, -2)

C. (-1, 2)

D. (-1, -2)

**Answer: A**



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73. The coordinates of the orthocentre formed by the lines

$$y = m_i x + \frac{a}{m_i}, i = 1, 2, 3 \text{ are}$$

A. (-a, 0)

B. (0, -a)

C.  $\left( -a, a \left[ \frac{1}{m_1} + \frac{1}{m_2} + \frac{1}{m_3} + \frac{1}{m_1 m_2 m_3} \right] \right)$

D. none

**Answer: C**



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74. The equations to the sides of a triangle are  $x - 3y = 0$ ,  $4x + 3y + 5$ ,  $3x + y = 0$ . The line  $3x - 4y = 0$  passes through

A. the incentre

B. the centroid

C. the circumcentre

D. the orthocentre of the triangle

**Answer: D**



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75. Two vertices of a triangle are  $(5, -1)$  and  $(-2, 3)$ . If the centroid of the triangle is the origin, then the third vertex is

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76. If  $P, Q, R$  lie on  $xy = c^2$ , then the orthocentre of  $\triangle PQR$  lies on

A.  $x + y = 0$

B.  $2x + 3y = c$

C.  $xy = c^2$

D. none

**Answer: C**

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77. If the orthocentre of the triangle formed by the lines  $2x + 3y - 1 = 0$ ,  $x + 2y - 1 = 0$ ,  $ax + by - 1 = 0$  is at the origin,



then  $(a, b)$  is given by

A.  $(6, 4)$

B.  $(-3, 3)$

C.  $(-8, 8)$

D.  $(0, 7)$

**Answer: C**



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**78.** Let  $P(-1, 0)$ ,  $Q(0, 0)$  and  $R(3, 3\sqrt{3})$  be three points. The equation of the bisector of the angle PQR is

A.  $\sqrt{3} + y = 0$

B.  $x + \frac{\sqrt{3}}{2}y = 0$

C.  $\frac{\sqrt{3}}{2}x + y = 0$

D.  $x + \sqrt{3}y = 0$

**Answer: A**



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**79.** The base of an equilateral triangle  $x + y = 2 = 0$  and opposite vertex is  $(2, -1)$ . Find the equations of the remaining sides .

A.  $y + 1 = (2 \pm \sqrt{3})(x + 2)$

B.  $y - 1 = (2 \pm \sqrt{3})(x - 2)$

C.  $y + 1 = (2 \pm \sqrt{3})(x - 2)$

D.  $y + 1 = (\sqrt{3} \pm 1)(x - 2)$

**Answer: C**



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**80.** The ends of the base of an isoceses triangle are at  $(2a, 0)$  and  $(0, a)$ .

The equation of one side is  $x = 2a$  . The equation of the other side is

A.  $x + y = a$

B.  $x + 2y = a$

C.  $x + 2y = 2a$

D.  $2x + y = 2a$

**Answer: C**



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**81.** The area of the triangle formed by the lines

$2x + y - 4 = 0$ ,  $3x + 2y - 5 = 0$ ,  $x + y + 1 = 0$  is

A. 2

B. 4

C. 6

D. 8

**Answer: A**

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82. The line  $3x+2y=24$  meets the  $y$ -axis at A and the  $x$ -axis at B. The perpendicular bisector of AB meets the line through  $(0,-1)$  parallel to the  $x$ -axis at C. If the area of triangle ABC is A, then the Value of  $A/13$  is

-----

A. 85

B. 87

C. 90

D. 91

**Answer: D**

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83. The line  $3x+2y=24$  meets the  $y$ -axis at A and the  $x$ -axis at B. The perpendicular bisector of AB meets the line through  $(0,-1)$  parallel to the

x-axis at C. If the area of triangle ABC is A, then the value of  $A/13$  is

-----

A. 81

B. 91

C. 71

D. 61

**Answer: B**



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**84.** The area of the triangle formed by the y-axis, the line L passing through the point (1, 1) and (2, 0) and the straight line perpendicular to the line L and passing through  $(1/2, 0)$  is

A.  $25/19$

B.  $25/16$

C.  $23/16$

**Answer: B**



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**85.** A line meets the coordinate axes at A and B such that the centroid of  $\triangle OAB$  is  $(1, 2)$ . The equation of the line AB is

A.  $x + y = 6$

B.  $2x + y = 6$

C.  $x + 2y = 6$

D. none

**Answer: B**



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86. Let  $P(-1, 0)$ ,  $Q(0, 0)$  and  $R(3, 3\sqrt{3})$  be three points. The equation of the bisector of the angle PQR is

A.  $\sqrt{3}x + 2y = 0$

B.  $x + \sqrt{3}y = 0$

C.  $\sqrt{3}x + y = 0$

D.  $2x + \sqrt{3}y = 0$

**Answer: C**



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87. In  $\triangle ABC$ , if  $B = (1, 2)$ ,  $C = (5, 6)$  and the internal bisector of the angle at A cuts BC at  $D(4, 5)$  then  $AB : AC =$

A. 2 : 1

B. 3 : 1

C. 1 : 3

D. 1 : 2

**Answer: B**



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**88.** In a triangle ABC, if  $A=(1,2)$  and the internal angle bisectors through B and C are  $y=x$  and  $y=-2x$ , then the inradius  $r$  of  $\triangle ABC$  is

A.  $(7, 2), (4, 2)$

B.  $(7, -2), (4, 3)$

C.  $(5, 2), (4, 3)$

D. none

**Answer: B**



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89. The base of a triangle lies along the line  $x=a$  and is of length  $a$ . The area of the triangle is  $a^2$ . The locus of the third vertex is

A.  $x = 0$

B.  $x = -a$

C.  $x = a/2$

D.  $x = a$

**Answer: B**



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90.  $A(1, 0)$ ,  $B(0, 1)$  are two points. If  $P(x, y)$  is a point such that  $xy > 0$  and  $x + y < 1$  then

A.  $P$  lies either inside  $\triangle OAB$  or in third quadrant

B.  $P$  can not be inside  $\triangle OAB$

C.  $P$  lies inside the  $\triangle OAB$

D. none

**Answer: A**



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91. The quadrilateral formed by the lines  $x + 8y + 37 = 0$ ,  $7x - 6y + 11 = 0$ ,  $x + 8y - 87 = 0$ ,  $7x - 6y - 51 = 0$  is

A. parallelogram

B. rectangle

C. rhombus

D. square

**Answer: A**



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92. The lines  $2x + y = 1$ ,  $x + 2y = 1$ ,  $2x + y = 3$ ,  $x + 2y = 3$  form

- A. parallelogram
- B. rectangle
- C. rhombus
- D. square

Answer: C



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93. The quadrilateral formed by the lines

$x - y + 2 = 0$ ,  $x + y = 0$ ,  $x - y - 4 = 0$ ,  $x + y - 12 = 0$  is

- A. parallelogram
- B. rectangle
- C. rhombus
- D. square

**Answer: B**



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94. The quadrilateral formed by the lines

$$x + y - 3 = 0, x - y + 3 = 0, x + y + 1 = 0, x - y - 1 = 0 \text{ is}$$

A. parallelogram

B. rectangle

C. rhombus

D. square

**Answer: D**



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95. The quadrilateral formed by the lines

$$\sqrt{3}x + y = 0, \sqrt{3}y + x = 0, \sqrt{3}x + y = 1, \sqrt{3}y + x = 1 \text{ is}$$

A. rectangle

B. square

C. rhombus

D. none

**Answer: C**



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**96.** The area of the quadrilateral formed by the lines

$x - y + 2 = 0$ ,  $x + y = 0$ ,  $x - y - 4 = 0$ ,  $x + y - 12 = 0$  is

A. 36

B. 52

C. 8

D. 124

**Answer: A**



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97. A : The area of the parallelogram formed by  $4x - 7y - 13 = 0$ ,  $8x - y - 39 = 0$ ,  $4x - 7y + 39 = 0$ ,  $8x - y + 13 = 0$  is 52.

R : The area of the parallelogram formed by  $a_1x + b_1y + c_1 = 0$ ,  $a_1x + b_1y + d_1 = 0$ ,  $a_2x + b_2y + c_2 = 0$ ,  $a_2x + b_2y + d_2 = 0$  is  $\left| \frac{(c_1 - d_1)(c_2 - d_2)}{a_1b_2 - a_2b_1} \right|$

A. 36

B. 52

C. 8

D. 124

**Answer: B**



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98. The area of the quadrilateral formed by the lines  $a|x| + b|y| + c = 0$  is

A.  $\frac{2c^2}{ab^2}$

B.  $\frac{2c^2}{ab}$

C.  $\frac{2c}{a^2b}$

D.  $\frac{2c}{ab^2}$

**Answer: B**



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99. Find the area enclosed with in the curve

$$|x| + |y| = 1$$

A. 2

B.  $1/2$

C. 1

D. 4

**Answer: A**



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**100.** The area of the parallelogram formed by the lines  $4y - 3x - a = 0$ ,  $3y - 4x + a = 0$ ,  $4y - 3x - 3a = 0$ ,  $3y - 4x + 2a = 0$  is

A.  $a^2 / 5$

B.  $a^2 / 7$

C.  $2a^2 / 7$

D.  $2a^2 / 9$

**Answer: C**



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101.  $P(2, 1)$ ,  $Q(4, -1)$ ,  $R(3, 2)$  are the vertices of a triangle and if through  $P$  and  $R$  lines parallel to opposite sides are drawn to intersect in  $S$ , then the area of  $PQRS$  is

A. 6

B. 4

C. 8

D. 12

**Answer: B**



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102. A point moves in the  $xy$ -plane such that the sum of its distances from two mutually perpendicular lines is always equal to 5 units. The area (in square units) enclosed by the locus of the point, is

A.  $25/4$

B. 25

C. 50

D. 100

**Answer: C**



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**103.** The angle between the lines  $4x - y + 9 = 0$ ,  $25x + 15y + 27 = 0$  is

A.  $\pi/2$

B.  $\pi/4$

C. 0

D.  $\pi/6$

**Answer: B**



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104. The angle between the lines

$x \cos \alpha + y \sin \alpha = p_1$  and  $x \cos \beta + y \sin \beta = p_2$  where  $\alpha > \beta$  is

- A.  $\alpha + \beta$
- B.  $\alpha - \beta$
- C.  $\alpha\beta$
- D.  $2\alpha - \beta$

**Answer: B**



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105. The angle between the lines formed by joining the points (2, -3), (-5, 1) and (7, -1), (0, 3) is

- A.  $\pi/2$
- B.  $\pi/4$
- C. 0

D.  $\pi/6$

**Answer: C**



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**106.** Find the angle between the lines

$$ax + by = a + b, a(x - y) + b(x + y) = 2b$$

A.  $\pi/2$

B.  $\pi/4$

C. 1

D.  $\pi/6$

**Answer: B**



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107. If  $\theta$  is the angle between the lines  $x/a + y/b = 1$ ,  $x/b + y/a = 1$ , then  $\cos \theta =$

A.  $\frac{2ab}{a^2 + b^2}$

B.  $\frac{ab}{a^2 + b^2}$

C.  $\frac{a^2 + b^2}{2ab}$

D.  $\frac{a^2 + b^2}{ab}$

**Answer: A**



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108. If  $\theta$  is the angle between  $y = 2x + 3$ ,  $y = x + 1$ , the value of  $\tan \theta =$

A.  $21/5$

B.  $1/3$

C.  $5/3$

D.  $-2$

**Answer: B**



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**109.** The angle between the line joining the points  $(1, -2)$ ,  $(3, 2)$  and the line  $x + 2y - 7 = 0$  is

A.  $\pi$

B.  $\pi/2$

C.  $\pi/3$

D.  $\pi/6$

**Answer: B**



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110. If the acute angle between the lines  $4x - y + 7 = 0$ ,  $kx + 5y - 9 = 0$  is  $45^\circ$ , then the value of  $k$  is

A.  $-3, 25/3$

B.  $1, -4$

C.  $2$  or  $-1/2$

D.  $5$  or  $2/3$

**Answer: A**



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111. If the acute angle between the lines  $2x + 3y - 5 = 0$ ,  $5x + ky - 6 = 0$  is  $\pi/4$ , then  $k =$

A.  $1$

B.  $2$

C.  $-1$

D. -2

**Answer: A**



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112. If  $2x + ky - 10 = 0$ ,  $5x + 2y - 7 = 0$  are parallel, then the value of  $k =$

A.  $4/3$

B.  $4/5$

C.  $5/3$

D. 6

**Answer: B**



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113. If  $3x - ky - 2 = 0$ ,  $2x + y + 2 = 0$  are perpendicular, then the value of  $k =$

A.  $4/3$

B.  $4/5$

C.  $5/3$

D. 6

**Answer: D**



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114. A line passing through the points  $(a, 2a)$  and  $(-2, 3)$  is perpendicular to the line  $4x + 3y + 5 = 0$ , then the value of  $a$  is

A.  $18/5$

B. 18

C. 5

D. 1

**Answer: A**



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**115.** The value of  $k$  such that the straight line  $(2x + 3y + 5) + k(x - 7y + 6) = 0$  is parallel to x-axis is

A.  $21/5$

B.  $1/3$

C.  $5/3$

D.  $-2$

**Answer: D**



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116. The value of  $k$  such that the line  $3x + 4y + 5 - k(x + y + 3) = 0$  is parallel to  $y$ -axis is

- A. 1
- B. 2
- C. 3
- D. 4

**Answer: D**



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117. The value of  $k$  such that the straight line  $3x + 14y + 7 + k(5x + 7y + 6) = 0$  is perpendicular to  $x$ -axis is

- A.  $21/5$
- B.  $1/3$
- C.  $5/3$

D.  $-2$

**Answer: D**



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**118.** The value of  $k$  such that the line  $2x + 3y + 4 + k(6x - y + 12) = 0$  is perpendicular to the line  $7x + 5y = c$  is

A.  $29/37$

B.  $-29/37$

C.  $-27/37$

D.  $-28/37$

**Answer: B**



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119. The lines  $p(p^2 + 1)x - y + q = 0$  and  $(p^2 + 1)^2x + (p^2 + 1)y + 2q = 0$  are perpendicular to a common line for

- A. exactly one value of  $p$
- B. exactly two values of  $p$
- C. more than two values of  $p$
- D. no value of  $p$

**Answer: A**



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120. If the straight line  $a(x + y - 1) + b(2x - 3y + 1) = 0$  for different values of  $a$  and  $b$  are parallel to  $y$ -axis then the relationship between  $a$  &  $b$  is

- A.  $b = 3a$

B.  $a = 3b$

C.  $a + 3b = 0$

D.  $b + 3a = 0$

**Answer: B**



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**121.** The diagonals of the parallelogram formed by the lines  $a_1x + b_1y + c_1 = 0$ ,  $a_1x + b_1y + c_1^1 = 0$ ,  $a_2x + b_2y + c_1 = 0$ ,  $a_2x + b_2 + c_1^1$  will be right angles if

A.  $\frac{a_1}{a_2} = \frac{b_1}{b_2}$

B.  $\frac{a_1^2}{b_1^2} = \frac{a_2^2}{b_2^2}$

C.  $a_1^2 + b_1^2 + b_2^2$

D. none

**Answer: D**

122. The diagonals of the parallelogram whose sides are  $lx + my + n = 0$ ,  $lx + my + n_1 = 0$ ,  $mx + ly + n = 0$ ,  $mx + ly = n_1 = 0$  include an angle

A.  $\frac{\pi}{3}$

B.  $\frac{\pi}{2}$

C.  $\tan^{-1} \left( \frac{l^2 - m^2}{l^2 + m^2} \right)$

D.  $\tan^{-1} \left( \frac{2lm}{l^2 + m^2} \right)$

**Answer: B**

123. The angle between the diagonals of the parallelogram formed by the lines  $\frac{x}{a} + \frac{y}{b} = 1$ ,  $\frac{x}{b} + \frac{y}{a} = 1$ ,  $\frac{x}{a} + \frac{y}{b} = 2$ ,  $\frac{x}{b} + \frac{y}{a} = 2$  is

A.  $\pi/6$

B.  $\pi/4$

C.  $\pi/3$

D.  $\pi/2$

**Answer: D**

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**124.** The angles of the triangle formed by the lines

$$5x + 3y - 15 = 0, x + y - 4 = 0, 2x + y - 6 = 0 \text{ is}$$

A.  $\cos^{-1}\left(\frac{4}{\sqrt{17}}\right), \cos^{-1}\left(\frac{13}{\sqrt{170}}\right), \pi + \cos^{-1}\left(\frac{3}{\sqrt{10}}\right)$

B.  $\cos^{-1}\left(\frac{4}{\sqrt{17}}\right), \cos^{-1}\left(\frac{13}{\sqrt{170}}\right), \pi - \cos^{-1}\left(\frac{3}{\sqrt{10}}\right)$

C.  $\cos^{-1}\left(\frac{2}{\sqrt{5}}\right), \frac{\pi}{2}, \frac{\pi}{2} - \cos^{-1}\left(\frac{2}{\sqrt{5}}\right)$

D.  $\cos^{-1}\left(\frac{2}{\sqrt{5}}\right), \frac{\pi}{2}, \frac{\pi}{2} + \cos^{-1}\left(\frac{2}{\sqrt{5}}\right)$

**Answer: B**





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125. The lines  $(a + b)x + (a - b)y = 2ab$ ,  $(a - b)x + (a + b)y = 2ab$ , and  $x + y = 0$  form an isosceles triangles whose vertical angle is

A. 0

B.  $\pi/4$

C.  $2 \tan^{-1}(a/b)$

D.  $2 \tan^{-1}(2ab/(a^2 - b^2))$

**Answer: C**



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126. Show that the straight lines  $(a - b)x + (b - c)y = c - a$ ,  $(b - c)x + (c - a)y = a - b$  and  $(c - a)x + (a - b)y = b - c$  are concurrent.

A. form an equilateral triangle

B. are concurrent

C. form an isosceles triangle

D. right angled triangle

**Answer: B**



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**127.** Show that the lines  $x - 7y - 22 = 0$ ,  $3x + 4y + 9 = 0$  and  $7x + y - 54 = 0$  form a right angled isosceles triangle.

A. form an equilateral triangle

B. are concurrent

C. form an isosceles triangle

D. form a right angled isosceles triangle

**Answer: D**

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128. The lines  $2x - y - 1 = 0$ ,  $3x - y - 7 = 0$ ,  $3x - 2y + 4 = 0$

- A. form an equilateral triangle
- B. are concurrent
- C. form an isosceles triangle
- D. form a right angled isosceles triangle

**Answer: B**

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129. The straight lines  $2x + 3y = 5$  and  $6x - 4y + k = 0$ ,  $k \in \mathbb{R}$  are the sides of [if the third line is not parallel any of these two lines]

- A. an equilateral triangle
- B. right angled triangle

C. obtuse angled triangle

D. can not be the sides of a triangle

**Answer: B**



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**130.** The equation of the line passing through  $(1, 1)$  and makes an angle  $\pi/4$  with the line  $2x - y + 7 = 0$  is

A.  $3x + y + 4 = 0$

B.  $3x - y + 4 = 0$

C.  $3x + y - 4 = 0$

D.  $3x - y - 4 = 0$

**Answer: C**



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131. The equation of a straight line passing through the point (1, 2) and inclined at  $45^\circ$  to the line  $y = 2x + 1$  is

A.  $5x + y = 7$

B.  $3x + y = 5$

C.  $x + y = 3$

D.  $x - y + 1 = 0$

Answer: B



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132. The equations of the lines passing through (-10, 4) and making an angle  $\tan^{-1} 2$  with the line  $2y = x - 10$  are

A.  $3x + 4y + 14 = 0, x + 10 = 0$

B.  $3x + 4y - 14 = 0, x + 10 = 0$

C.  $3x - 4y + 14 = 0, x + 10 = 0$

D.  $3x - 4y - 14 = 0, x + 10 = 0$

**Answer: A**



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**133.** The equation of the straight line through the origin, whose intercept between the lines  $5x + 12y = 15$  and  $5x + 12y = 30$  is equal to 3 is

A.  $x = 10$

B.  $y = 0$

C.  $x = 3$

D.  $y = 3$

**Answer: B**



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**134.** The equation of a straight line passing through (1, 2) and having intercept of length 3 between the straight lines  $3x + 4y = 24$  and  $3x + 4y = 12$  is

A.  $7x + 24y - 55 = 0$

B.  $24x + 7y - 38 = 0$

C.  $24x - 7y - 10 = 0$

D.  $7x - 24y + 41 = 0$

**Answer: D**



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**135.** The equations of the lines passing through (4, 5) and making equal angles with the lines  $3x = 4y + 7$ ,  $5y = 12x + 6$  are

A.  $y + 2 = 0$ ,  $\sqrt{3}x - y = 2 + 3\sqrt{3}$

B.  $3x + y - 4 = 0$ ,  $x - 3y + 2 = 0$

C.  $9x - 7y = 1, 7x + 9y = 73$

D. none of these

**Answer: C**



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**136.** ABCD is a parallelogram. Equations of  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{AD}$  are  $4x + 5y = 0, 7x + 2y = 0$  and the equation of the diagonal  $\overleftrightarrow{BD}$  is  $11x + 7y = 9$ . Then the equation of  $\overleftrightarrow{AC}$  is

A.  $x = y$

B.  $x + y = 0$

C.  $7x - 11y = 0$

D.  $7x + 11y = 0$

**Answer: A**



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137. The equation to the diagonal through the origin of the quadrilateral formed by  $x = 0$ ,  $y = 0$ ,  $x + y = 1$  and  $6x + y = 3$  is

A.  $x + 3y = 2$

B.  $2x + 5y = 3$

C.  $3x - 2y = 0$

D.  $3x + 2y = 2$

Answer: C



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138. The points  $A(1,2), B(3,-4)$  are two vertices of the rectangle ABCD. The point  $P(3,8)$  lies on the CD produced then C =

A.  $\left(\frac{33}{5}, \frac{14}{5}\right)$

B.  $\left(-\frac{33}{5}, \frac{14}{5}\right)$

C.  $\left(\frac{33}{5}, -\frac{14}{5}\right)$

D.  $\left(-\frac{33}{5}, -\frac{14}{5}\right)$

**Answer: C**



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**139.** The diagonal of a square is  $8x - 15y = 0$  and one vertex of the square is  $(1, 2)$ . The equations to the sides of the square passing through this vertex are

A.  $22x + 8y = 9, 22x - 8y = 52$

B.  $23x + 7y = 9, 7x - 23y = 52$

C.  $23x - 7y = 9, 7x + 23y = 53$

D. none

**Answer: C**



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140. If the opposite vertices of a square are  $(-2, 3)$  and  $(8, 5)$ , then the equations of the sides of that square are

A.

$$3x - 2y + 12 = 0, 3x + 2y - 14 = 0, 2x - 3y + 51 = 0, 2x + 3y - 3 = 0$$

B.

$$3x - 2y + 12 = 0, 3x - 2y + 14 = 0, 2x + 3y - 51 = 0, 2x + 3y - 3 = 0$$

C.

$$3x - 2y + 12 = 0, 3x + 2y + 14 = 0, 2x - 3y + 51 = 0, 2x + 3y - 3 = 0$$

D.

$$3x - 2y + 12 = 0, 3x - 2y - 14 = 0, 2x + 3y - 5 = 0, 2x + 3y - 31 = 0$$

**Answer: D**



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141. The ends of the base of an isosceles triangle are at  $(2a, 0)$  and  $(0, a)$ .

The equation of one side is  $x = 2a$ . The equation of the other side is

A.  $x + 2y - a = 0$

B.  $x + 2y = 2a$

C.  $3x + 4y - 4a = 0$

D.  $3x - 4y + 4a = 0$

**Answer: D**



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142. The foot of the perpendicular of the point  $(3, -5)$  in y-axis is

A.  $(2, 0)$

B.  $(0, -5)$

C.  $(7, -4)$

D.  $(-2, -3)$

**Answer: B**



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**143.** The foot of the perpendicular of the point  $(-2, 5)$  in  $y + 3 = 0$  is

A.  $(2, 0)$

B.  $(0, -5)$

C.  $(7, -4)$

D.  $(-2, -3)$

**Answer: D**



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**144.** If  $(2, -3)$  is the foot of the perpendicular from  $(-4, 5)$  on a line, then the equation of the line is

A.  $3x + 4y = 18$

B.  $3x - 4y = 18$

C.  $3x + 4y = 20$

D.  $3x - 4y = 20$

**Answer: B**



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**145.** If PM is the perpendicular from  $P(2, 3)$  on to the line  $x + y = 3$  the

M=

A. (2, 1)

B. (-1, 4)

C. (1, 2)

D. (4, -1)

**Answer: C**

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146. The image of the line  $x + y - 2 = 0$  in the  $y$ -axis is

A.  $x - y + 2 = 0$

B.  $y - x + 2 = 0$

C.  $x + y + 2 = 0$

D.  $x + y - 2 = 0$

**Answer: A**

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147. A : The foot of the perpendicular from  $(3, 4)$  on the line  $3x - 4y + 5 = 0$  is  $(81/25, 92/25)$

R : If  $(h, k)$  is the foot of the perpendicular from  $(x_1, y_1)$  to the line

$$ax + by + c = 0 \text{ then } \frac{h - x_1}{a} = \frac{h - k_1}{b} = \frac{-(ax_1 + by_1 + c)}{a^2 + b^2}$$

A.  $\left(\frac{81}{25}, \frac{92}{25}\right)$

B.  $\left(\frac{92}{25}, \frac{81}{25}\right)$

C.  $\left(\frac{46}{25}, \frac{54}{25}\right)$

D.  $\left(\frac{-81}{25}, \frac{92}{25}\right)$

**Answer: A**



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**148.** The foot of the perpendicular from  $(0, 0)$  to the line

$$x \cos \alpha + y \sin \alpha = p \text{ is}$$

A.  $(\cos \alpha, \sin \alpha)$

B.  $(p \cos \alpha, p \sin \alpha)$

C.  $(p / \cos \alpha, p / \sin \alpha)$

D.  $(p \sin \alpha, p \cos \alpha)$

**Answer: B**



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**149.** Prove that the feet of the perpendicular from the origin on the lines  $x + y = 4$ ,  $x + 5y = 26$ ,  $15x - 27y = 424$  are collinear.

A.  $3x + y - 8 = 0$

B.  $3x - 7 + 8 = 0$

C.  $3x + y + 8 = 0$

D.  $3x - y - 8 = 0$

**Answer: A**

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**150.** The image of the point  $(2, -1)$  w.r.t the point  $(1, -4)$  is

A.  $(1, 2)$

B.  $(0, 5)$

C. (0, -7)

D. (4, -3)

**Answer: C**



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**151.** The image of the point (2, 1) w.r.t the line  $x + 1 = 0$  is

A. (2, 5)

B. (0, 5)

C. (-4, 1)

D. (-2, -3)

**Answer: C**



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152. The image of the point  $(3, 4)$  w.r.t the line  $3x + 4y + 5 = 0$  is

A.  $\left(\frac{21}{5}, \frac{28}{5}\right)$

B.  $\left(\frac{21}{5}, -\frac{28}{5}\right)$

C.  $\left(-\frac{21}{5}, \frac{28}{5}\right)$

D.  $\left(-\frac{21}{5}, -\frac{28}{5}\right)$

**Answer: D**



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153. The image of the point  $(3, 8)$  in the line  $x + 3y = 7$  is

A.  $(1, 4)$

B.  $(4, 1)$

C.  $(-1, -4)$

D.  $(-4, -1)$

**Answer: C**



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**154.** The coordinate of the image of the origin  $O$  with respect to the straight line  $x + y + 1 = 0$  are

A.  $(-1/2, -1/2)$

B.  $(-2, -2)$

C.  $(1, 1)$

D.  $(-1, -1)$

**Answer: D**



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**155.** The reflection of the point  $(6, 8)$  in the line  $x = y$  is

A. (4, 2)

B. (-6, -8)

C. (-8, -10)

D. (8, 6)

**Answer: D**



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**156.** The image of the point (4, -13) with respect to the line

$5x + y + 6 = 0$  is :

A. (-1, -14)

B. (3, 4)

C. (1, 2)

D. (-4, 13)

**Answer: A**

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157. If  $(-2, 6)$  is the image of the point  $(4, 2)$  with respect to the line  $L = 0$ , then  $L =$

A.  $6x - 4y - 7$

B.  $2x + 3y - 5$

C.  $3x - 2y + 5$

D.  $3x - 2y + 10$

**Answer: C**

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158. If the image of  $(-7/5, -6/5)$  in a line is  $(1, 2)$ , then the equation of the line is

A.  $3x - y = 0$

B.  $4x - y = 0$

C.  $3x + 4y = 1$

D.  $4x + 3y = 1$

**Answer: C**



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**159.** The image of the point  $(4, -13)$  with respect to the line  $5x + y + 6 = 0$  is :

A.  $(57/13, -168/13)$

B.  $(3, 4)$

C.  $(1, 2)$

D.  $(-4, 13)$

**Answer: A**



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160. If the point  $(1, 2)$  is reflected through the origin and then through the line  $x = y$ , then the new coordinates of the point are

A.  $(1, 2)$

B.  $(2, -1)$

C.  $(2, 1)$

D.  $(-2, 1)$

**Answer: C**



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161. A ray of light along  $x + \sqrt{3}y = \sqrt{3}$  gets reflected upon reaching x-axis, the equation of the reflected ray is

A.  $y = \sqrt{3}x - \sqrt{3}$

B.  $\sqrt{3}y = x - 1$



C.  $y = x + \sqrt{3}$

D.  $\sqrt{3}y = x - \sqrt{3}$

**Answer: D**



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**162.** If  $2x - 3y - 5 = 0$  is the perpendicular bisector of the line segment joining  $(3, -4)$  and  $(\alpha, \beta)$  then find  $\alpha + \beta$ .

A.  $-81/13$

B.  $-136/13$

C.  $-135/13$

D.  $-134/15$

**Answer: A**



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163. If  $x + 3y = 16$  is the perpendicular bisector of  $\overline{AB}$  and  $A(5, 7)$ , then

B is

A. (2, 1)

B. (3, 1)

C. (9, 1)

D. (-2, -3)

**Answer: B**



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164. If  $2x + 3y = 5$  is the perpendicular bisector of the line segment joining the points  $A\left(1, \frac{1}{3}\right)$  and B, then B is equal to

A.  $\left(\frac{21}{13}, \frac{49}{39}\right)$

B.  $\left(\frac{17}{13}, \frac{31}{39}\right)$

C.  $\left(\frac{7}{13}, \frac{49}{39}\right)$

D.  $\left(\frac{21}{13}, \frac{31}{39}\right)$

**Answer: A**

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**165.** Suppose A,B are two points on  $2x - y + 3 = 0$  and P(1,2) is such that  $PA = PB$ . Then the mid point of AB is

A.  $\left(\frac{-1}{5}, \frac{13}{5}\right)$

B.  $\left(\frac{-7}{5}, \frac{9}{5}\right)$

C.  $\left(\frac{7}{5}, \frac{-9}{5}\right)$

D.  $\left(\frac{-7}{5}, \frac{-9}{5}\right)$

**Answer: A**

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**166.** The equation of perpendicular bisectors of AB and AC of a triangle ABC are  $x-y-5=0$  and  $x+2y=0$  respectively. If  $A=(1,-2)$  then the equation of  $\overline{BC}$  is

A.  $14x + 23y - 40 = 0$

B.  $14x - 23y + 20 = 0$

C.  $23x - 14y + 40 = 0$

D.  $23x + 14y - 20 = 0$

**Answer: A**



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**167.** The image of  $3x - 4y + 11 = 0$  with respect to  $2x - y - 1 = 0$  is

A.  $3x + 4y - 5 = 0$

B.  $4x + 3y - 5 = 0$

C.  $x = 3$

$$D. 5x + 12y - 2 = 0$$

**Answer: C**



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**168.** The image line of  $2x - y - 1 = 0$  w.r.t.  $3x - 2y + 4 = 0$  is

A.  $22x + 19y + 77 = 0$

B.  $22x - 19y + 77 = 0$

C.  $2x - y + 7 = 0$

D.  $3x - 2y + 11 = 0$

**Answer: B**



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1. The equation of the line perpendicular to the line  $2x + 3y - 5 = 0$  and passing through  $(3, -4)$  is

- A. only I is true
- B. only II is true
- C. both I and II are true
- D. neither I nor II are true

**Answer: B**



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2. If  $(-4, 5)$  is one vertex and  $7x - y + 8 = 0$  is one diagonal of a square, then the equation of the second diagonal is

- A. only I is true
- B. only II is true
- C. both I and II are true

D. neither I nor II are true

**Answer: C**



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3. The normal form of line  $\sqrt{3}x = y + 4 = 0$  is

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: B**



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4. The slope of a straight line passing through A(-2, 3) is  $-4/3$ . The points on the line that are 10 unit away from A are

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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5. I : The point on the line  $2x + 3y = 5$  which is equidistant from (1, 2), (3, 4) is (4, 1).

II : The point equidistant to the lines

$4x + 3y + 10 = 0$ ,  $5x - 12y + 26 = 0$ ,  $7x + 24y - 50 = 0$  is (0, 0).

A. only I is true



B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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6. The circumcentre of the triangle passing through  $(1, \sqrt{3})$ ,  $(1, -\sqrt{3})$ ,  $(3, -\sqrt{3})$  is

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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7. The quadrilateral formed by the lines

$$\sqrt{3}x + y = 0, \sqrt{3}y + x = 0, \sqrt{3}x + y = 1, \sqrt{3}y + x = 1$$

- A. only I is true
- B. only II is true
- C. both I and II are true
- D. neither I nor II are true

**Answer: B**



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8. I : The  $2x + ky - 10 = 0, 5x + 2y - 7 = 0$  are parallel then  $k = 4$ .

II : If  $2x + ky - 10 = 0, 5x + 2y - 7 = 0$  are perpendicular then  $k = 5$ .

- A. only I is true
- B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: D**



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9. I : The foot of the perpendicular of  $(3, -5)$  in  $y$ -axis is  $(-5, 3)$ .

II. If  $(2, -3)$  is the foot of the perpendicular from  $(-4, 5)$  on a line then the equation of the line is  $3x - 4y = 18$ .

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: B**



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10. I : The image of the point  $(2, 1)$  with respect to the line  $x + 1 = 0$  is  $(-4, 1)$ .

II. If the point  $(1, 2)$  is reflected through origin and then through the line  $x = y$  then the new coordinates of the point are  $(-2, -1)$ .

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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**Exercise 2 Special Type Questions Set 2**

1. The arrangement of the following straight lines in ascending order of their slopes

$$(A) 2y = \sqrt{3}x \quad (B) y = 2 \quad (C) y = x \quad (D) y = -x$$

A. A, B, C, D

B. D, B, A, C

C. B, C, D, A

D. D, A, B, C

**Answer: B**



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2. If A, B, C are the x intercepts of the lines  $2x + 3y = 4$ ,  $3y - 5x + 7 = 0$ ,  $x + y + 1 = 0$  then the ascending order of A, B, C is

A. A, B, C

B. B, A, C

C. C, B, A

D. A, B, C

**Answer: C**



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3. The equation of the line passing through the point  $P(1, 2)$  such that  $P$  bisects the part intercepted between the axes is

A. a, b, c

B. c, a, b

C. b, c, a

D. c, b, a

**Answer: D**



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4. Write the ascending order of areas of the triangles formed with coordinate axes and the following lines

(A)  $x + y + 3 = 0$     (B)  $x + y + 1 = 0$     (C)  $2x + y - 6 = 0$     (D)  $4x +$

A. A, B, C, D

B. B, A, D, C

C. C, A, B, D

D. D, C, A, B

**Answer: B**



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5. Write the ascending order of the distance between the parallel lines

(A)  $2x + 3y + 1 = 0$ ,  $2x + 3y + 14 = 0$

(B)  $3x + 4y + 10 = 0$ ,  $3x + 4y + 5 = 0$

(C)  $x + y + 1 = 0$ ,  $x + y + 3 = 0$

(D)  $2x + y + 1 = 0$ ,  $2x + y + 6 = 0$

A. B, C, D, A

B. A, B, C, D

C. B, D, C, A

D. B, C, A, D

**Answer: A**



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**6.** Write the descending order of the perpendicular distance of the line

$2x - y + 5 = 0$

from

(A)(2, 1)    (B)(2, -1)    (C)(-2, 1)    (D)(-2, -1)

A. A, B, C, D

B. B, A, D, C

C. B, D, C, A



D. B, C, D, A

**Answer: B**



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7. The equation of the line passing through the point of intersection of the lines  $2x + y + 1 = 0$ ,  $x - y - 7 = 0$  and the point  $(3, -2)$  is

A. a, b, c

B. c, a, b

C. b, c, a

D. c, b, a

**Answer: D**



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1. Match the following

Line	Slope
<i>I.</i> $33x - 3y - 38 = 0$	(a) $-2/3$
<i>II.</i> $4x - y - 2 = 0$	(b) 4
<i>III.</i> $2x + 3y - 6 = 0$	(c) $-2/13$
<i>IV.</i> $2x + 25y = 1$	(d) 11
	(e) $-2/25$

A. a, b, c, d

B. d, b, a, e

C. b, d, e, c

D. b, d, c, a

**Answer: B**



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## 2. Match the following

I. The line passing through  $(5, 4)$  with slope  $-7/2$  is

(a)  $2x - y$

II. The altitude through A of triangle ABC where

(b)  $5x - 9y$

$A(1, 1)$ ,  $B(-3, 4)$ ,  $C(2, -5)$  is

III. The perpendicular bisector of the line segment joining

(c)  $7x + 2y$

$(1, 2)$ ,  $(-3, 4)$  is

IV. The line perpendicular to  $2x + 3y - 4 = 0$  and passing

(d)  $3x - 2y$

through origin is

A. d, b, a, e

B. d, c, b, e

C. d, e, b, c

D. c, b, a, d

**Answer: D**



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### 3. Match the following

Line

Area of the triangle formed with axes

*I.*  $x + y = 10\sqrt{2}$

(a)  $\sqrt{3}/2$

*II.*  $2x - 3y - 6 = 0$

(b)  $72/\sqrt{3}$

*III.*  $\sqrt{3}x + y - 12 = 0$

(c) 6

*IV.*  $3x - 4y - 12 = 0$

(d) 100

(e) 3

A. d, b, a, e

B. d, c, b, e

C. d, e, b, c

D. a, b, c, d

**Answer: C**



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#### 4. Match the following

Line

Distance from origin

*I.*  $x - 2y + 1 = 0$       (a)  $7/\sqrt{10}$

*II.*  $x + \sqrt{3}y + 2 = 0$       (b)  $4/\sqrt{5}$

*III.*  $3x - y + 7 = 0$       (c)  $1/\sqrt{5}$

*IV.*  $2x - y - 4 = 0$       (d) 1

(e)  $7/10$

A. c, d, a, b

B. a, b, c, d

C. b, a, c, d

D. e, c, d, a

**Answer: A**



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### 5. Match the following

Line

I.  $3x + 4y = 6$

II.  $5x - 2y + 10 = 0$

III. joining the points  $(2, -1), (-1, 2)$

IV. Joining the points  $(4, -7), (1, -5)$

Intercepts

(a)  $-\frac{13}{2}, -\frac{13}{3}$

(b)  $5, \frac{5}{3}$

(c)  $-2, 5$

(d)  $2, \frac{3}{2}$

A. c, d, a, b

B. c, b, a, d

C. d, c, b, a

D. a, b, c, d

**Answer: C**



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6. Match the following

- I. Line passing through  $(-4, 3)$  and having intercepts in the ratio  $5:3$  (a) 2
- II. Line passing through  $P(2, -5)$  such that P bisects the part intercepted between the axes (b) 5
- III. Line parallel to  $2x - 3y + 5 = 0$  with x-intercept  $2/5$  is (c) 3
- IV. Line perpendicular to  $5x + 2y + 7 = 0$  with x-intercept  $4/5$  is (d) 1

A. b,c, d, a

B. c, b, d, a

C. d, c, b, a

D. a, b, c, d

Answer: B



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## 7. Match the following

System of lines

Point of concurrence

I.  $(3k - 1)x - (2k + 3)y + (9 - k) = 0$  (a)  $(-2, 1)$

II.  $(a + 2b)x + (a - b)y + (a + 5b) = 0$  (b)  $(3, 4)$

III.  $(2x + 3y + 1) + k(3x - 2y - 5) = 0$  (c)  $(2, 2)$

IV.  $a(x + y - 4) + b(2x - y - 2) = 0$  (d)  $(1, -1)$

A. b, c, d, a

B. b, a, d, c

C. d, c, b, a

D. a, b, c, d

**Answer: B**



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## 8. Match the following

I. Foot of the perpendicular from  $(3, 4)$  to the line  $3x - 4y = 18$  (a)  $(-7/5, -1)$

II. Image of  $(-3, 4)$  with respect to the origin (b)  $(-1, -3)$

III. Image of  $(1, 2)$  with respect to  $3x + 4y - 1 = 0$  (c)  $(6, 0)$

IV. The reflection of  $(4, -13)$  in the line  $5x + y + 6 = 0$  (d)  $(3, -4)$



A. c, d, a, b

B. c, b, d, a

C. d, c, b, a

D. a, b, c, d

**Answer: A**



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## Exercise 2 Special Type Questions Set 4

1. A : The equation of the line passing through (1, 2) with slope  $\frac{2}{5}$  is

$$2x - 5y + 8 = 0$$

R : The equation of the line passing through  $(x_1, y_1)$  with slope  $m$  is

$$y - y_1 = m(x - x_1)$$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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2. A : Equation of the line passing through  $(-2, 3)$  and parallel to  $3x - 4y + 7 = 0$  is  $3x - 4y + 18 = 0$ .

R : Equation of the line passing through  $(x_1, y_1)$  and parallel to  $ax + by + c = 0$  is  $a(x - x_1) + b(y - y_1) = 0$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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3. A : Equation of the line passing through (3, -4) and perpendicular to  $2x + 3y + 7 = 0$  is  $3x - 2y - 17 = 0$ .

R : Equation of the line passing through  $(x_1, y_1)$  and perpendicular to  $ax + by + c = 0$  is  $b(x - x_1) - a(y - y_1) = 0$

- A. A, R are correct, R is correct explanation of A
- B. A, R are correct, R is not correct explanation of A
- C. A is true, R is false
- D. A is false, R is true

**Answer: A**



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4. A : The distance between the straight lines  $2x - y + 3 = 0, y = 2x + 4$  is  $1/\sqrt{5}$ .

R : Distance between parallel lines  $ax + by + c_1 = 0$ ,  $ax + by + c_2 = 0$

is  $\frac{|c_1 - c_2|}{\sqrt{a^2 + b^2}}$ .

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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5. A : If the angle between the lines  $kx - y + 6 = 0$ ,  $3x + 5y + 7 = 0$  is  $\pi/4$  one value of k is 4

R : If  $\theta$  is angle between the lines with slopes  $m_1, m_2$  then

$$\tan \theta = \frac{|m_1 - m_2|}{|1 + m_1 m_2|}$$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: D**



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6. A : The number of lines that can be drawn through the point  $(4, -5)$  at a distance of 10 units from the point  $(1, 3)$  is zero

R : Required distance is greater than the distance between points or distance 10 units from  $(1, 3)$  through  $(4, -5)$  is not possible

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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7. A : The ratio in which the perpendicular through  $(4, 1)$  divides the line joining  $(2, -1)$ ,  $(6, 5)$  is  $5 : 8$ .

R : The ratio in which the line  $ax + by + c = 0$  divides the line segment joining  $(x_1, y_1)$ ,  $(x_2, y_2)$  is  $(ax_1 + by_1 + c) : -(ax_2 + by_2 + c)$ .

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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8. A : The area of the rhombus formed by  $|x| + |y| = 1$  is 2

R : The area of the rhombus formed by  $ax \pm by \pm c$  is  $2c^2 / |ab|$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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9. A : The area of the parallelogram formed by  $4x - 7y - 13 = 0$ ,  $8x - y - 39 = 0$ ,  $4x - 7y + 39 = 0$ ,  $8x - y + 13 = 0$  is 52.

R : The area of the parallelogram formed by  $a_1x + b_1y + c_1 = 0$ ,  $a_1x + b_1y + d_1 = 0$ ,  $a_2x + b_2y + c_2 = 0$ ,  $a_2x + b_2y + d_2 = 0$  is  $\left| \frac{(c_1 - d_1)(c_2 - d_2)}{a_1b_2 - a_2b_1} \right|$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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10. A : The foot of the perpendicular from (3, 4) on the line  $3x - 4y + 5 = 0$  is  $(81/25, 92/25)$

R : If (h, k) is the foot of the perpendicular from  $(x_1, y_1)$  to the line

$$ax + by + c = 0 \text{ then } \frac{h - x_1}{a} = \frac{h - k_1}{b} = \frac{-(ax_1 + by_1 + c)}{a^2 + b^2}$$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**







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11. A : The reflection of  $(6, 8)$  in the line  $x = y$  is  $(8, 6)$

R : The reflection of  $(x_1, y_1)$  in the line  $x = y$  is  $(y_1, x_1)$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



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12. A : The image of the origin with respect to the line  $x + y + 1 = 0$  is  $(-1, -1)$

R : If  $(h, k)$  is the image of  $(x_1, y_1)$  with respect to the line

$$ax + by + c = 0 \text{ then } \frac{h - x_1}{a} = \frac{h - k_1}{b} = \frac{-2(ax_1 + by_1 + c)}{a^2 + b^2}$$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

**Answer: A**



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