MATHS

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RECTANGULAR COORDINATES, STRAIGHT LINES, FAMILY OF LINES

Solved Examples

1. The incentre of triangle formed by lines $x = 0, y = 0$ and $3x + 4y = 12$ is

A. (3,1)

B. (1,2)

C. (2,1)

D. (1,1)

Answer: D

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2. The perpendicular distance between two parallel lines $3x + 4y - 6 = 0$ and $6x + 8y + 7 = 0$ is equal to

A. $\frac{19}{10}$ unit

B. $\frac{19}{2}$ unit

C. $\frac{19}{5}$ unit

D. $\frac{10}{19}$ unit

Answer: A

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3. In what ratio will the point $\left(\frac{1}{2}, \frac{-13}{4}\right)$ internally divide the line segment joining the point (3,-5) and(-7, 2)?

A. $\frac{1}{3}$

B. $\frac{1}{4}$

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

D. $\frac{1}{5}$

Answer: A

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4. The locus of a point which is equidistant from point (4,2) and x-axis is

A. $h^2 - 8h - 4k + 20 = 0$

B. $h^2 - 8h + 4k - 20 = 0$

C. $h^2 - 6h + 4k + 20 = 0$

D. None of these

Answer: A

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5. If points (5,5), (10, k) and (-5, 1) are collinear, then the value of k is

A. 8

B. 7

C. 9

D. 6

Answer: B

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1. The points $(1, 1), (-1, -1)$ and $(-\sqrt{3}, \sqrt{3})$ are the angular points of a triangle, then the triangle is

A. right angled

B. isosceles

C. equilateral

D. None of these

Answer: C

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2. The triangle formed by the points $A(2a, 4a)$, $B(2a, 6a)$ and $C\left(2a + \sqrt{3}a, 5a\right)$ is

A. right angled

B. isosceles

C. equilateral

D. None of these

Answer: C

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3. The points $A(12, 8), B(-2, 6)$ and C(6,0) are the vertices of

A. right angled triangle

B. isosceles triangle

C. equilateral triangle

D. None of these

Answer: A

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4. Vertices of a ΔABC are $A(2, 2), B(-4, -4)$ and C(5,-8), then the length of the median through C is

A. $\sqrt{65}$

B. $\sqrt{117}$

C. $\sqrt{85}$

D. $\sqrt{113}$

Answer: C

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5. The co-ordinates of the middle points of the sides of a triangle are (4,2),(3,3) and (2,2) then the co-ordinates of its centroid are

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

B. $(3, 3)$

C. $(4, 3)$

D. None of these

Answer: A

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6. Mid-points of the sides AB and AC of a ΔABC are (3, 5) and (-3, -3) respectively, then the length of the side BC is

A. 10 unit

B. 20 unit

C. 15 unit

D. 30 unit

Answer: B

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7. The extremities of the diagonal of a parallelogram are the points (3,-4) and (-6,5). Third vertex is the point (-2,1), then the fourth vertex is

A. (1,1)

B. (1,0)

C. (0,1)

D. $(-1, 0)$

Answer: D

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8. If $P(1, 2), Q(4, 6), R(5, 7)$ and S(a,b) are the vertices of a parallelogram PQRS then

A. a=2,b=4

B. a=3,b=4

C. a=2,b=3

D. a=3,b=5

Answer: C

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9. The vertices of a ΔABC has coordinates $(\cos\theta, \sin\theta)$, $(\sin\theta, -\cos\theta)$ and (1,2). As θ varies the locus of centroid of the triangle is the circle

A. $x^2 + y^2 - 2x - 4y + 1 = 0$

B. $3(x^2 + y^2) - 2x - 4y + 1 = 0$

C. $x^2 + y^2 - 2x - 4y + 3 = 0$

D. None of these

Answer: B

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10. ABC is an isosceles triangle. If the coordinates of the base are B(1,3) and C(-2,7), the coordinates of vertex A can be

A. $(1, 6)$

B. $\left(-\frac{1}{2}, 5 \right)$

C. $\left(\frac{5}{6}, 6\right)$

D. $\left(7, -\frac{1}{8}\right)$

Answer: C

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11. The vertices of a ΔABC are $(\lambda, 2-, 2\lambda), (-\lambda+1, 2\lambda)$ and $(-4-\lambda, 6-2\lambda)$. If its area be 70 units, then number of integral values of λ is

A. 1

B. 2

C. 4

D. 0

Answer: C

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12. The area of a triangle is 5 and two of its vertices are A(2,1),B(3,-2). The third vertex which lies on line $y = x + 3$ is

A. $\left(\frac{7}{2}, \frac{13}{2}\right)$

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

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

D. (0,0)

Answer: A

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13. If the co-ordinates of points A,B,C,D are (6,3),(-3,5),(4,-2) and (x,3x) respectively and if $\frac{\Delta DBC}{\Delta ABC} = \frac{1}{2}$, then x=

A. $\frac{8}{11}$

B. $\frac{11}{8}$

C. $\frac{7}{9}$

D. 0

Answer: B

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14. The points $(-a, -b), (0, 0), (a, b)$ and (a^2, ab) are

A. collinear

B. vertices of a rectangle

C. vertices of a parallelogram

D. None of the above

Answer: A

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15. If the points $(2k, k), (k, 2k)$ and (k, k) with $k > 0$ enclose in a triangle of area 18 sq units, then the centroid of triangle is equal to

A. (8,8)

B. (4,4)

C. (-4,-4)

D. $\left(4\sqrt{2}, 4\sqrt{2}\right)$

Answer: A

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16. The distance between the points $(a\cos\alpha, a\sin\alpha)$ and $(a\cos\beta, a\sin\beta)$ where $a > 0$

A. $2a \sin\left(\frac{\alpha+\beta}{2}\right)$

B. $2a \cos\left(\frac{\alpha+\beta}{2}\right)$

C. $2a \sin\left(\frac{\alpha-\beta}{2}\right)$

D. $2a \cos\left(\frac{\alpha-\beta}{2}\right)$

Answer: C

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17. The points (x,2x),(2y,y) and (3,3) are collinear

A. for all values of (x,y)

B. 2 is AM of x,y

C. 2 is GM of x,y

D. 2 is HM of x,y

Answer: D

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18. Line L is perpendicular to the lines $5x - y = 1$. The area of triangle formed by the line and coordinate axes is 5. Its equation is

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

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

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

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

Answer: B

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19. If m_1 and m_2 are the roots of an equation $x^2 + (\sqrt{3} + 2)x + (\sqrt{3} - 1) = 0$, then the

area of the triangle formed by the lines $y = m_1 x, y = m_2 x, y = c$ is

A. $\left(\frac{\sqrt{33} + \sqrt{11}}{4} \right) c^2$

B. $\left(\frac{\sqrt{32} + \sqrt{11}}{16} \right) c$

C. $\left(\frac{\sqrt{33} + \sqrt{10}}{4} \right) c^2$

D. $\left(\frac{\sqrt{33} + \sqrt{21}}{4} \right) c^3$

Answer: A

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20. The equation of the base of an equilateral triangle is $x + y = 2$ and the vertex is (2,-1). Length of its side is

A. $\sqrt{\frac{1}{2}}$

B. $\sqrt{\frac{3}{2}}$

C. $\sqrt{\frac{2}{3}}$

D. $\sqrt{2}$

Answer: C

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21. The distance between the lines $4x + 3y = 11$ and $8x + 6y = 15$ is

A. $\frac{7}{2}$ unit

B. $\frac{7}{3}$ unit

C. $\frac{7}{5}$ unit

D. $\frac{7}{10}$ unit

Answer: D

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22. A, B and C are the points (a, p), (b,q) and (c,r) respectively such that a, b and c are in AP and p,q and r in GP. If the points are collinear, then

A. $p = q = r$

B. $p^2 = q$

C. $q^2 = r$

D. $r^2 = p$

Answer: A

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23. The equations of perpendicular bisectors of the sides AB and AC of a ΔABC are $x - y + 5 = 0$ and $x + 2y = 0$, respectively. If the point A is (1, - 2) the equation of the line BC is

A. $23x + 14 - 40 = 0$

B. $23 + 14y + 40 = 0$

C. $14x + 23y - 40 = 0$

D. $14x + 23y + 40 = 0$

Answer: C

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24. A point P(h, k) lies on the straight line $x + y + 1 = 0$ and is at a distance 5 from the origin. If k is negative, then h is equal to

A. -3

B. 3

C. -4

D. 4

Answer: B

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25. The equations of the straight lines through (3, 2) which make acute angle of 45° with the line $x - 2y - 3 = 0$ is (are)

A. $x + 3y = 9$ and $3x - y = 7$

B. $x - 3y = 9$ and $3x + y = 7$

C. $x - 3y = 7$ and $3x - y = 9$

D. $x + 3y = 7$ and $3x + y = 7$

Answer: A

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26. The number of integral 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 is

A. 2

B. 0

C. 4

D. 1

Answer: A

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27. The equation of the straight line which makes angle of 15° with the positive direction of x-axis and which cuts an intercept of length 4 on the negative direction of y-axis, is

A. $y = \left(2 - \sqrt{3}\right)x - 4$

B. $y = (2 + \sqrt{3})x + 4$

C. $y = (2 - \sqrt{3})x + 4$

D. $y = (2 + \sqrt{3})x - 4$

Answer: A

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28. The equation of straight line passing through the point of intersection of the straight line $3x - y + 2 = 0$ and $5x - 2y + 7 = 0$ and having infinite slope is

A. $x=2$

B. $x+y=3$

C. $x=3$

D. $x=4$

Answer: C

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29. The diagonals of a parallelogram ABCD are along are the lines $x+3y=4$ and $6x-2y=7$. Then ABCD must be a

A. rectangle

B. square

C. cyclic quadrilateral

D. rhombus

Answer: D

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30. The orthocentre of triangle with vertices $\left(2, \frac{\sqrt{3}-1}{2}\right), \left(\frac{1}{2}, -\frac{1}{2}\right), \left(2, , -\frac{1}{2}\right)$

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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