MATHS

BOOKS - OMEGA PUBLICATION

STRAIGHT LINES

Question

1. The base of an equilateral triangle with side 2a lies along the y-axis such that the mid-point of the base is at the origin. Find the vertices of triangle.

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2. Find a point on the x-axis which is equidistant from the points (7, 6) and (3, 4).

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3. Find the slope of a line, whch passes through the origin and the mid-point of the line segment joining the points P(0, -4) and B(8, 0).

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4. Find the values of x for which the points (x, -1), (2, 1) and (4, 5) are collinear.

5. Find the angle between x-axis and the line joining the points (3,-1) and (4, -2).

6. If three points A(h,0), B(a, b) and C(0, k) lie on line, show that $\dfrac{a}{h} + \dfrac{b}{k} = 1$.

7. Without using the pythagorus, show that the points (4, 4), (3, 5) and (-1, -1) are the vertices of a right angled triangle.

8. The slope of a line is double of the slope of another line. If tangent of the angle between them is $\frac{1}{3}$, find the slopes of the line.

9. Find the equation of the line which satisfying the given conditions:

passing through the point (-4, 3) with slope $\dfrac{1}{2}$.

10. Find the equation of the line which satisfying the given conditions:

passing through $\left(2, 2\sqrt{3}\right)$ and inclined with the x-axis at an angle of $75°$.

11. Find the equation of the line which satisfying the given conditions:

intersecting the y-axis at a distance of 2 units above the origin and making an angle of $30°$ with positive direction of the x-axis.

12. Find the equation of the line which satisfy the given conditions:

passing through the points (-1, 1) and (2, -4).

13. Find the equation of the line which satisfy the given conditions:

perpendicular distance from the origin is 5 units and the angle made by the perpendicular with the positive x-axis is $30°$.

14. Find the equation of the line passing through (-3, 5) and perpendicular to the line through the points (2, 5) and (-3, 6).

15. A line perpendicular to the line-segment joining the points (1, 0) and (2, 3) divides it the ratio 1 : n. Find the equation of the line.

16. Find the equation of a line that cuts off equal intercepts on the co-ordinate axes and passes through (2, 3).

17. Find the equations of the lines passing through the point (2, 2) such that the sum of their intercepts on the axes is 9.

18. Find the equation of the line through the point (0, 2) making an angle $\dfrac{2\pi}{3}$ with the positive x-axis. Also, find the equation of the line parallel to it and crossing the y-axis at a distance of 2 units below the origin.

19. The perpendicular from the origin to a line meet at the point (-2, 9), find the equation of the line.

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20. Be using the concept of equation of a line prove that the three points (3, 0), (-2, -2) and (8, 2) are collinear.

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21. Reduce the following equations into slope-intercept form and find their slopes and the y-intercepts.

$$x + 7y = 0$$

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22. Reduce the following equations into slope-intercept form and find their slopes and the y-intercepts.

$$6x + 3y - 5 = 0$$

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23. Reduce the following equations into intercept form and find their intercepts on the axes.

$$3x + 2y - 12 = 0$$

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24. Reduce the following equations into intercept form and find their intercepts on the axes.

$$4x - 3y = 6$$

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25. Reduce the following equations into the normal form. Find their perpendicular distance from the origin and angle between perpendicular and positive direction of x-axis.

$(i) x - \sqrt{3}y + 8 = 0$ $(ii) x - y = 4.$

26. Find the point on the x-axis, whose distances from the line $\dfrac{x}{3} + \dfrac{y}{4} = 1$ are 4 units.

27. Find the distance between the parallel lines

(i) $15x + 8y - 34 = 0$ and $15x + 8y + 31 = 0$.

28. Find equation of the line parallel to the line $3x - 4y + 2 = 0$ and passing through the point (-2, 3).

29. Find the equation of the line perpendicular to the line $x - 7y + 5 = 0$ and having x-intercept 3.

30. Find angles between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y = 1.$

31. Prove that the line through the point (x_1, y_1) and parallel to the line $Ax + By + C = 0$ is $A(x - x_1) + B(y - y_1) = 0.$

32. Find the equation of the right bisector of the line segment joining the points (3, 4) and (-1, 2).

33. Find the coordinates of the foot of perpendicular from a point (-1, 3) to the line $3x - 4y - 16 = 0$.

34. If p and q are the lengths of perpendicular from origin to the lines

$x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y\mathrm{cosec}\theta = k$ respectively. Prove that $p^2 + 4q^2 = k^2$.

35. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then show that $\dfrac{1}{p^2} = \dfrac{1}{a^2} + \dfrac{1}{b^2}$.

Important Questions From Miscellaneous Exercise

1. Find the value of k for which the line

$$(k - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0.$$

(a) parallel to x-axis (b) parallel to y-axis.

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2. Find the equations of the lines which cut off intercepts on the axes whose sum and product are 1 and -6 respectively.

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3. Find perpendicular distance of the line joining the points $(\cos\theta, \sin\theta)$ and $(\cos\phi, \sin\phi)$ from the origin.

4. Find the equation of a line drawn perependicular to the line $\dfrac{x}{4} + \dfrac{y}{6} = 1$, through the point where it meets the y-axis.

5. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, find the value of m.

6. Find the equation of the line passing through the point of intersection of the lines $4x + 7y - 3 = 0, 2x - 3y + 1 = 0$ that has equal intercepts on the axes.

7. In what ratio, the line joining (-1, 1) and (5, 7) is divided by the line $x + y = 4$?

8. Find the image of the point (3, 8) with respect to the line $x + 3y = 7$, assuming line as a plane mirror.

9. Find the equation of the line which is equidistant from parallel lines $9x + 6y - 7 = 0$ and

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

10. A ray of light passes through the point (1, 2) reflects on the x-axis at a point A and the reflected ray passes through the point (5, 3). Find the coordinates of A.

11. Find the equation of the line through the intersection of lines

$3x + 4y = 7$ and $x - y + 2 = 0$ and whose slope is 5.

12. Find the equation of the line through the intersection of $5x - 3y = 1$ and $2x + 3y - 23 = 0$ and perpendicular to the line $5x - 3y - 1 = 0$.

13. Find the new coordinates of the points in each of the following cases if the origin is shiftedto

point (-3, -2) by a translation of axes.

(i) (1, 1) (ii) (0, 1)

14. Find what the following equations become when the origin is shifted to the point (1, 1)

$$x^2 + xy - 3y^2 - y + 2 = 0$$

15. Find what the following equations become when the origin is shifted to the point (1, 1)

$$xy - y^2 - x + y = 0$$

16. Find what the following equations become when the origin is shifted to the point (1, 1)

$$xy - x - y + 1 = 0$$

Multiple Choice Questions Mcqs

1. The point on the axis of y which its equidistant from (-1, 2) and (3, 4), is

    A. (0, 4)

    B. (0, 5)

    C. (5, 0)

    D. none of these

Answer: B

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2. 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

3. The point which divides the join of (1, 2) and (3, 4) externally in the ratio 1:1

A. lies in the Ist quadrant

B. lies in the IInd quadrant

C. lies in the IIIrd quadrant

D. cannot be found.

Answer: D

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4. If the vertices P, Q, R are rational points, which of the following points of the triangle PQR is (are) always rational point(s)?

    A. centroid

    B. incentre

    C. circumcentre

    D. orthocentre

Answer: A

5. The lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular to each other if

    A. $a_1b_2 - a_2b_1 = 0$

    B. $a_1a_2 + b_1b_2 = 0$

    C. $a_1^2b_2 + b_1^2a_2 = 0$

    D. $a_1b_1 + a_2b_2 = 0$

Answer: B

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6. The angle between the lines $2x - y + 3 = 0$ and $x + 2y + 3 = 0$ is

A. $90°$

B. $60°$

C. $45°$

D. $30°$

Answer: A

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7. A triangle with vertices (4, 0), (-1, -1), (3,5) is

A. isosceles and right angled

B. isosceles but not right angled

C. right angled but not isosceles

D. neither right angled nor isosceles

Answer: A

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8. Three vertices of a parallelogram taken in order are (-1, -6), (2, -5) and (7, 2). The fourth vertex is

A. (1, 4)

B. (1, 1)

C. (4, 4)

D. (4, 1)

Answer: D

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9. The line passing through (0, 1) and perpendicular to the line $x - 2y + 11 = 0$ is

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

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

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

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

Answer: B

10. The equation of line in the intercept form is

A. $\dfrac{x}{a} - \dfrac{y}{b} = ab$

B. $\dfrac{x}{a} + \dfrac{y}{b} = 1$

C. $ax + by = c$

D. none of these

Answer: B

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11. The equation of the straight line which passes through the point (1, -2) and cuts off equal intercepts from the axes will be

A. $x + y = 1$

B. $x - y = 1$

C. $x + y + 1 = 0$

D. $x - y - 2 = 0$

Answer: C

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12. The equation of the straight line which passes through the point (1, 2) and cuts off equal intercepts from the axes will be

A. $x + y = 1$

B. $x - y = 1$

C. $x + y - 3 = 0$

D. $x - y - 2 = 0$

Answer: C

13. The equation of the line that has x-intercept -3 and is perpendicular to the line $3x = 4 - 5y$ is :

    A. $3y = 5x - 15$

    B. $3y = 15 - 5x$

    C. $3y = 5x + 15$

    D. $3x = 15 + 5y$

Answer: C

14. The equations $ax + by + c = 0$ and $dx + ey + f = 0$ represent the same straight line if

A. $\dfrac{a}{d} = \dfrac{b}{c}$

B. c = f

C. $\dfrac{a}{d} = \dfrac{b}{e} = \dfrac{c}{f}$

D. $a = d, b = e, c = f$

Answer: C

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