MATHS

BOOKS - NCERT MATHS (ENGLISH)

STRAIGHT LINES

Short Answer Type Questions

1. Find the equation of the straight line which passes through the point $(1 - 2)$ and cuts off equal intercepts from axes.

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2. Find the equation of the line passing through the point $(5, 2)$ and perpendicular to the line joining the points (2,3) and (3,-1).

3. Find the angle between the lines $y = \left(2 - \sqrt{3}\right)(x + 5)$ and $y = \left(2 + \sqrt{3}\right)(x - 7)$.

4. Find the equations of the line which passes through the point $(3, 4)$ and the sum of its intercepts on the axes is 14.

5. The points on $x + y = 4$ that lie at a unit distance from the line $4x + 3y - 10 = $ are

6. Show that the tangent of an angle between the lines $\dfrac{x}{a} + \dfrac{y}{b} = 1$ and $\dfrac{x}{a} - \dfrac{y}{b} = 1$ and $\dfrac{2ab}{a^2 - b^2}$.

7. Find the equation of a line passing through $(1, 2)$ and making angle of 30^0 with y-axis .

8. Find the equation of the line passing through the intersection of the lines $2x + y = 5\ and\ x + 3y + 8 = 0$ and parallel to the line $3x + 4y = 7$.

9. For what values of a and b the intercepts cut off n the coordinate axes by the line $ax + by + 8 = 0$ are equal in length but opposite in signs to those cut off by the line $2x - 3y + 6 = 0$ on the axes.

10. If the intercept of a line between the coordinate axes is divided by the point $(-5, 4)$ in the ratio $1 : 2$, then find the equation of the line.

11. a Find equation of a straight line on which length of perpendicular from the origin is four units and the line makes an angle of 120^0 with the positive direction of x-axis.

12. Find the equations the sides of an isosceles right angled triangle the equation of whose hypotenuse is $3x + 4y = 4$ and the opposite vertex is the point (2, 2).

1. The equation of the base of an equilateral triangle is $x + y = 2$ and its vertex is $(2, -1).$ Find the length and equations of its sides.

2. A variable line passes through a fixed point P. The algebraic sum of the perpendiculars drawn from the points (2,0), (0,2) and (1,1) on the line is zero. Find the coordinate of the point P.

3. Angle made with the x-axis by a straight line drawn through (1, 2) so that it intersects $x + y = 4$ at a distance $\dfrac{\sqrt{6}}{3}$ from (1, 2) is 105^0 (b) 75^0 (c) 60^0 (d) 15^0

4. Astraight line moves so that the sum of the reciprocals of its intercepts made on axes is constant. Show that the line passes through a fixed point.

5. The equation of the straight line which passes through the point $(-4, 3)$ such that the portion of the line between the axes is divided internally be the point in the ratio $5:3$ is (a) $9x - 20y + 96 = 0$ (b) $9x + 20y = 24$ (c) $20x - 9y + 53 = 0$ (d) none of these

6. Find the equations of the lines through the point of intersection of the lines $x - y + 1 = 0 and 2x - 3y + 5 = 0$ whose distance from the point $(3, 2)$ is 7/5.

7. If the sum of the distances of a moving point in a plane from the axes is 1, then find the locus of the point.

8. P_1, P_2 are points on either of the two line $y - \sqrt{3}|x| = 2$ at a distance of 5 units from their point intersection. Find the coordinatesof the foot of perpendiculars drawn from P_1, P_2 on the bisector of the angle between the given lines.

9. If p is the length of perpendicular from the origin on the line $\dfrac{x}{a} + \dfrac{y}{b} = 1$ and a^2, p^2 and b^2 are in AP, the show that $a^4 + b^4 = 0$.

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Objective Type Questions

1. A line cutting off intercept -3 from the $Y - $ axis and the tangent at angle to the $X - $ axis is $\dfrac{3}{5}$, its equation is

A. $5y - 3x + 15 = 0$

B. $3y - 5x + 15 = 0$

C. $5y - 3x - 15 = 0$

D. None of the above

Answer: A

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2. Slope of a line which cuts off intercepts of equal lengths on the axes is

A. -1

B. 0

C. 2

D. $\sqrt{3}$

Answer: A

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

    A. $x - y = 5$

    B. $x + y = 5$

    C. $x + y = 1$

    D. $x - y = 1$

Answer: B

4. The equation of the line passing through the point $(1, 2)$ and perpendicular to the line $x + y + 1 = 0$ is

A. $y - x + 1 = 0$

B. $y - x - 1 = 0$

C. $y - x + 2 = 0$

D. $y - x - 2 = 0$

Answer: B

5. Find the tangent of the angel between the lines whose intercepts n the axes are respectively $a, -b$ and $nb, -a$.

A. $\dfrac{a^2 - b^2}{ab}$

B. $\dfrac{b^2 - a^2}{2}$

C. $\dfrac{b^2 - a^2}{2ab}$

D. None of these

Answer: C

6. If the line $\dfrac{x}{a} + \dfrac{y}{b} = 1$ passes through the points a $(2, \, -3)$ and $(4, \, -5)$, then $(a, b) =$

   A. $(1, 1)$

   B. $(-1, 1)$

   C. $(1, -1)$

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

Answer: D

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7. The distance of the point of intersection of the lines

$2x - 3y + 5 = 0$ and $3x + 4y = 0$ from the line

$5x - 2y = 0$ is

A. $\dfrac{130}{17\sqrt{129}}$

B. $\dfrac{13}{7\sqrt{29}}$

C. $\dfrac{130}{7}$

D. None of these

Answer: A

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8. Show that the equations of eth straight lines passing through the point $(3, -2)$ and inclined at

60^0 to the line

$$\sqrt{3}x + y = 1 are y + 2 = 0 and y - \sqrt{3}x + 2 + 3\sqrt{3} = 0.$$

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

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

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

D. none of above

Answer: A

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9. Find the equations of lines passing through the point $(1, 0)$ and a distance $\dfrac{\sqrt{3}}{2}$ from the origin.

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

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

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

D. None of the above

Answer: A

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10. The distance between the lines $y = mx + c_1$ and $y = mx + c_2$ is

A. $\dfrac{c_1 - c_2}{\sqrt{m^2 + 1}}$

B. $\dfrac{|(c_1 - c_2)|}{\sqrt{1 + m^2}}$

C. $\dfrac{c_2 - c_1}{\sqrt{1 + m^2}}$

D. 0

Answer: B

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11. Find coordinates of the foot of perpendicular, image and equation of perpendicular drawn from the point $(2, 3)$ to the line $y = 3x + 4$.

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12. If the coordinates of the middle point of the portion of a line interceptecd between the coordinate axes is $(3, 2)$, then the equation of the line will be

A. $2x + 3y = 12$

B. $3x + 2y = 12$

C. $4x - 3y = 6$

D. $5x - 2y = 10$

Answer: A

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13. Equation of the line passing through $(1, 2)$ and parallel to the line $y = 3x - 1$ is

A. $y + 2 = x + 1$

B. $y + 2 = 3(x + 1)$

C. $y - 2 = 3(x - 1)$

D. $y - 2 = x - 1$

Answer: C

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14. Find the equations of the diagonals of the square formed by the lines $x = 0$, $y = 0$, $x = 1$ and $y = 1$.

A. $y = x$, $y + x = 1$

B. $y = x$, $x + y = 2$

C. $2y = x$, $y + x = \dfrac{1}{3}$

D. $y \equiv 2x$, $y + 2x = 1$

Answer: A

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15. For specifying a straight line, how many geomatrical parameters should be known ?

A. 1

B. 2

C. 4

D. 3

Answer: B

16. The point $(4, 1)$ undergoes the following two successive transformations

(i) Reflection about the line $y = x$

(ii) Translation through a distance 2 units along the positive X-axis.

Then the final coordinate of the point are

A. $(4, 3)$

B. $(3, 4)$

C. $(1, 4)$

D. $\left(\dfrac{7}{2}, \dfrac{7}{2} \right)$

Answer: B

17. A point equidistant from the line $4x + 3y + 10 = 0, 5x - 12y + 26 = 0$ and $7x + 24y - 50 = 0$ is

A. $(1, \ -1)$

B. $(1, 1)$

C. $(0, 0)$

D. $(0, 1)$

Answer: C

18. A line passes through the point $(2, 2)$ and is perpendicular to the line $3x + y = 3$, then its y-intercept is

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

B. $\dfrac{2}{3}$

C. 1

D. $\dfrac{4}{3}$

Answer: D

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19. Find the ratio in which the line $3x + 4y + 2 = 0$ divides the distance between the lines $3x + 4y + 5 = 0 \, and \, 3x = 4y - 5 = 0.$

A. $1 : 2$

B. $3 : 7$

C. $2 : 3$

D. $2 : 5$

Answer: B

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20. Find the coordinates of one vertex of an equilateral triangle with centroid at the origin and the opposite side $x + y - 2 = 0$.

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

B. $(2, 2)$

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

D. $(2, \ - 2)$

Answer: C

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Fillers

1. If a, b and c are in AP, then the straight line $ax + by + c = 0$ will always pass through a fixed point whose coordinates are_____

2. Find the equation of the straight line which passes through the point $(1 - 2)$ and cuts off equal intercepts from axes.

3. Find the equation of the lines through the point (3, 2) which make an angle of $45o$ with the line $x - 2y = 3$.

4. The points $(3, 4)$ and $(2, -6)$ are situated on the .... Of the line $3x - 4y - 8 \equiv 0$

5. A point moves so that square of its distance from the point $(3, -2)$ is numerically equal to its distance

from the line $5x - 12y = 3$. The equation of its locus

is ....

6. Find the locus of the mid-point of the portion of the

line $x \cos \alpha + y \sin \alpha = p$ which is intercepted

between the axes.

True False

1. If the vertices of a triangle have rational coordinates, then prove that the triangle cannot be equilateral.

2. The points A(-2,1), B(0,5) and C(-1,2) are collinear. check the statement is true or false.

3. Equation of the line passing through the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ and perpendicular to the line $x\sec\theta + y\cos ec\theta = a$ is $x\cos\theta - y\sin\theta = a\cos 2\theta$.

4. The line 5x + 4y = 0 passes through the point of intersection of straight lines (1) x+2y-10 = 0, 2x + y =-5

5. The vertex of an equilateral triangle is $(2, 3)$ and the equation of the opposite side is $x + y = 2$. Then, the other two sides are $y - 3 = \left(2 \pm \sqrt{3}\right)(x - 2)$.

6. The equation of the line joining the point $(3, 5)$ to the point of intersection of the lines $4x + y - 1 = 0$ and $7x - 3y - 35 = 0$ is equidistant from the points $(0, 0)$ and $(8, 34)$.

7. If the line $\left(\dfrac{x}{a}\right) + \left(\dfrac{y}{b}\right) = 1$ moves in such a way that $\left(\dfrac{1}{a^2}\right) + \left(\dfrac{1}{b^2}\right) = \left(\dfrac{1}{c^2}\right)$, where c is a constant, prove that the foot of the perpendicular from the origin on the straight line describes the circle $x^2 + y^2 = c^2$.

8. If the lines

$$ax + 2y + 1 = 0, bx + 3y + 1 = 0 and cx + 4y + 1 = 0$$

are concurrent, then a, b, c are a. A.P. b. G.P. c. H.P. d. none of these

9. Line joining the points (3,-4) and (-2,6) is perpendicular to the line joining the points (-3,6) and (9,-18).

1. Match the following

	Column I		Column II
(i)	The coordinates of the points P and Q on the line $x + 5y = 13$ which are at a distance of 2 units from the line $12x - 5y + 26 = 0$ are	(a)	$(3, 1), (-7, 11)$
(ii)	The coordinates of the point on the line $x + y = 4$, which are at a unit distance from the line $4x + 3y - 10 = 0$ are	(b)	$\left(-\dfrac{1}{3}, \dfrac{11}{3}\right), \left(\dfrac{4}{3}, \dfrac{7}{3}\right)$
(iii)	The coordinates of the point on the line joining $A(-2, 5)$ and $B(3, 1)$ such that $AP = PQ = QB$ are	(c)	$\left(1, \dfrac{12}{5}\right), \left(-3, \dfrac{16}{5}\right)$

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2. The value of the λ if the lines

$$(2x + 3y + 4) + \lambda(6x - y + 12) = 0 \text{ are}$$

	Column I		Column II
(i)	parallel to Y-axis is	(a)	$\lambda = -\dfrac{3}{4}$
(ii)	perpendicular to $7x + y - 4 = 0$ is	(b)	$\lambda = -\dfrac{1}{3}$
(iii)	passes through (1, 2) is	(c)	$\lambda = -\dfrac{17}{41}$
(iv)	parallel to X-axis is	(d)	$\lambda = 3$

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3. The equation of the line through the intersection of the lines $2x - 3y = 0$ and $4x - 5y = 2$ and

	Column I		Column II
(i)	through the point (2, 1) is	(a)	$2x - y = 4$
(ii)	perpendicular to the line $x + 2y + 1 = 0$	(b)	$x + y - 5 = 0$
(iii)	parallel to the line $3x - 4y + 5 = 0$ is	(c)	$x - y - 1 = 0$
(iv)	equally inclined to the axes is	(d)	$3x - 4y - 1 = 0$

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