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).

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

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4. Find the equations of the line which passes through the point $(3, 4)$ and the sum of its intercepts on the axes is14 .

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

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

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

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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 $3x + 4y = 7.$

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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.

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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.

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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.

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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).

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Long Answer Type

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.

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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.

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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 $\frac{\sqrt{6}}{3}$ from (1, 2) is 105^0 (b) 75^0 (c) 60^0 (d) 15^0

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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.

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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

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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.

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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.

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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.

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9. If p is the length of perpendicular from the origin on the line $\frac{x}{a}+\frac{y}{b}=1$ 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 $\frac{3}{5}$, 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

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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

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

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

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

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

D. None of these

Answer: C

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6. If the line $\frac{x}{a}+\frac{y}{b}=1$ 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. $\frac{130}{17\sqrt{129}}$

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

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

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 $\frac{\sqrt{3}}{2}$ 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. $\frac{c_1 - c_2}{\sqrt{m^2 + 1}}$

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

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

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

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

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

Answer: B

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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

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

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

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

C. 1

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

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_____

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

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

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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 .....

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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.

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True False

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

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

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

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

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

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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 $(8, 34)$.

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

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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

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

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Matching The Column

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)	$\left(-\frac{1}{3}, \frac{11}{3}\right), \left(\frac{4}{3}, \frac{7}{3}\right)$
(iii)	The coordinates of the point on the line joining $A(-2, 5)$ and $B(3, 1)$ such that $AP = PQ = QB$ are	(c)	$\left(1, \frac{12}{5}\right), \left(-3, \frac{16}{5}\right)$

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2. The value of the λ if the lines $(2x+3y+4)+\lambda(6x-y+12)=0$ are

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