



INDIAN SCHOOL DARSAIT

DEPARTMENT OF MATHEMATICS



Subject : Mathematics Topic : Straight Lines Date of Worksheet :27/8/2017

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Name of the Student : _____ Class & Division : XI Roll Number : ____

S.No.	Questions	Marks
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Section A (Basics):

- i) Slope of a line :
 $m = \tan \theta$, θ is the inclination of line.
 $m = \frac{y_2 - y_1}{x_2 - x_1}$, (x_1, y_1) and (x_2, y_2) lies on the line.
- ii) If two lines are parallel then their slopes are equal
 If two lines are perpendicular then product of their slopes is -1.
- iii) Angle between two lines:

$$\tan \theta = \left| \frac{m_2 - m_1}{1 + m_1 m_2} \right|$$
- iv) General equation of a line :
 $Ax + By + C = 0$
- v) Distance of a line $Ax + By + C = 0$ from a point (x_1, y_1) is

$$d = \frac{|Ax_1 + By_1 + C|}{\sqrt{A^2 + B^2}}$$
- vi) Distance between two parallel lines $Ax + By + C_1 = 0$ and $Ax + By + C_2 = 0$

$$d = \frac{|C_1 - C_2|}{\sqrt{A^2 + B^2}}$$
- vii) Various forms of equation of line:
 Point slope form : $(y - y_1) = m(x - x_1)$
 Two point form : $y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$
 Slope intercept form : $y = mx + c$, c is y - intercept
 $y = m(x - d)$, d is x - intercept
 Intercept form : $\frac{x}{a} + \frac{y}{b} = 1$
 Normal form : $x \cos \omega + y \sin \omega = p$

Section B :

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|----|---|---|
| 1. | Find the distance between the line $12x - 5y + 9 = 0$ and the point $(2, 1)$. | 2 |
| 2. | Find the equation of the line joining the points $(at_1^2, 2at_1)$ and $(at_2^2, 2at_2)$ | 2 |
| 3. | Find the equation of a line passing through $(3, 4)$ and sum of its intercepts on the axes is 14. | 4 |
| 4. | In what ratio is the line joining the points $(2, 3)$ and $(4, 1)$ divides the segment joining the points $(1, 2)$ and $(4, 3)$. | 6 |



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5. Show that the points $(at_1^2, 2at_1)$ and $(at_2^2, 2at_2)$ and $(a, 0)$ are collinear if $t_1 t_2 = -1$. 4
6. A line passing through the points $(a, 2a)$ and $(-2, 3)$ is perpendicular to the line $4x+3y+5=0$; find the value of a . 4
7. Find the equation of the line through the intersection of lines $3x + 4y = 7$ and $x - y + 2=0$ and whose slope is 5. 4
8. If three lines whose equations are $y = m_1x + c_1$, $y = m_2x + c_2$ and $y = m_3x + c_3$ are concurrent, show that $m_1(c_2 - c_3) + m_2(c_3 - c_1) + m_3(c_1 - c_2) = 0$. 6
9. Prove that the line joining the midpoints of the two sides of a triangle is parallel to the third side. 4
10. Find the coordinates of the foot of the perpendicular from the point $(-1, 3)$ to the line $3x - 4y - 16 = 0$. 4

Section C (Hots):

1. Show that the altitudes of a triangle are concurrent. 6
2. A person standing at a junction of two straight paths represented by the equations $2x - 3y - 4 = 0$ and $3x - 4y - 5 = 0$, wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Find the equation of the path he should follow. 6
3. Two sides of a square lie on the lines $x + y = 1$ and $x + y + 2 = 0$. What is its area? 4