

Essentials of Analytical Geometry and Linear Algebra I, Class #6

Innopolis University, October 2020

1. Find the slope of the line joining the points $(2, 3)$ and $(4, -5)$.
2. Find the slope of the line $2x - 3y + 7 = 0$.
3. Find the equation of the straight line, the portion of which between the axes is bisected at the point $(2, -5)$.
4. Find the equation of the straight line passing through the intersection of the lines $3x - y = 5$ and $2x + 3y = 7$ and making an angle of 45° with the positive direction of x-axis.
5. Find the equation of the straight line concurrent with the lines $2x + 3y = 3$ and $x + 2y = 2$ and also concurrent with the lines $3x - y = 1$ and $x + 5y = 11$.
6. $A(4, 1)$, $B(7, 4)$, and $C(5, -2)$ are the vertices of a triangle. Find the equation of the perpendicular line from A to BC .
7. Find the centroid of the triangle formed by the lines given by the equations $12x^2 - 20xy + 7y^2 = 0$ and $2x - 3y + 4 = 0$.
8. Find the condition that one of the lines given by $ax^2 + 2hxy + by^2 = 0$ may be perpendicular to one of the lines given by $a_1x^2 + 2h_1xy + b_1y^2 = 0$.

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1. Find the equation of the straight line making an angle 135° with the positive direction of x-axis and cutting off an intercept 5 on the y-axis.
2. Find the equation of the straight line cutting off the intercepts 2 and 5 on the axes.
3. Find the equation of the straight line passing through the points $(7, 3)$ and cutting off equal intercepts on the axes.
4. Find the equation of the straight line of the portion of which between the axes is divided by the point $(4, 3)$ in the ratio 2:3.
5. Find the equations to the straight lines each of which passes through the point $(3, 2)$ and intersect the x and y axes at A and B such that $OA - OB = 2$.
6. Prove that the triangle whose vertices are $(2, 5)$, $(3, 4)$, and $(7, 10)$ is a right angled isosceles triangle. Find the equation of the hypotenuse.
7. Find the equation of the straight line passing through the intersection of the lines $7x + 3y = 7$ and $2x + y = 2$ and cutting off equal intercepts on the axes.
8. Find the equation of the perpendicular bisector of the line joining the points $(2, 6)$ and $(4, 6)$.
9. Find the equation of the line through the intersection of $2x + y = 8$ and $3x + 7 = 2y$ and parallel to $4x + y = 11$.
10. Two sides of a triangle lie along $y^2 - m^2x^2 = 0$ and its orthocentre is (c, d) . Show that the equation of its third side is $(1 - m^2)(cx + dy) = c^2 - m^2d^2$.
11. Show that two of the straight lines $ax^3 + bx^2y + cxy^2 + dy^3 = 0$ will be perpendicular to each other if $a^2 + d^2 + bd + ac = 0$.