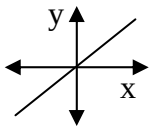
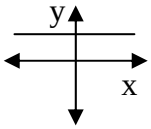
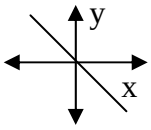
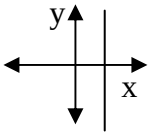
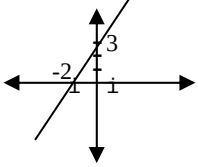
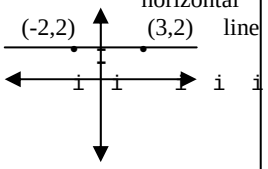
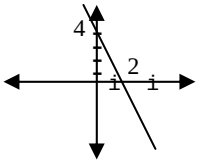
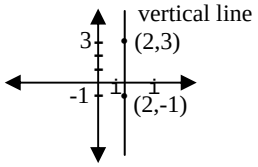
Straight Lines

	General Forms	Examples
Slope = m	Line through (x_1,y_1) and (x_2,y_2) = $m = \frac{y_2-y_1}{x_2-x_1} = \frac{y_1-y_2}{x_1-x_2}$ m > 0  m = 0  m < 0  m undefined 	Line through (6,-4) and (-1,10) $m = \frac{10-(-4)}{-1-6} = \frac{14}{-7} = -2$ m = $\frac{3}{2}$  m = 0  m = -2  m undefined 
Two-point form	Line through (x_1,y_1) and (x_2,y_2): First, calculate $m = \frac{y_2-y_1}{x_2-x_1}$ Equation of line: $y - y_1 = m(x - x_1)$	Line through (6,-4) and (-1,10) $m = \frac{10-(-4)}{-1-6} = \frac{14}{-7} = -2$ Equation of line: $y - (-4) = -2(x - 6)$ or $y + 4 = -2(x - 6)$
	Line through (x_1,y_1) and (x_2,y_1): $m = \frac{y_1-y_1}{x_2-x_1} = 0$ Equation of line: $y = y_1$	Line through (-2,2) and (3,2) $m = \frac{2-2}{3-(-2)} = \frac{0}{5} = 0$ Equation of line: $y = 2$
	Line through (x_1,y_1) and (x_1,y_2): $m = \frac{y_2-y_1}{x_1-x_1} = \frac{y_2-y_1}{0}$ = undefined Equation of line: $x = x_1$	Line through (2,3) and (2,-1) $m = \frac{-1-3}{2-2} = \frac{-4}{0}$ = undefined Equation of line: $x = 2$
Point-slope form	Line with slope m and passing through (x_1,y_1) Equation of line: $y - y_1 = m(x - x_1)$	Line with slope m = -2 passing through (6,-4) Equation of line: $y - (-4) = -2(x - 6)$ or $y + 4 = -2(x - 6)$

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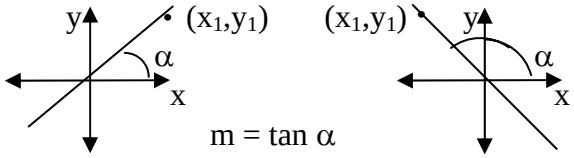
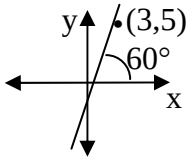
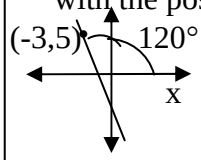
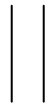
	General Forms	Examples
Slope intercept form	Line with slope m and y – intercept b. Equation of line: $y = mx + b$	Line with slope m = -2 and y – intercept b = 8 Equation of line: $y = -2x + 8$
Angle form	Line through the point (x_1,y_1) and making an angle α with the positive x-axis.  $m = \tan \alpha$ $y = y_1 + (x - x_1) \tan \alpha$ or $y - y_1 = (\tan \alpha)(x - x_1)$	Line through (3,5) making an angle of 60° with the positive x-axis.  $y = 5 + (x - 3) \tan 60°$ or $y = 5 + (x - 3)\sqrt{3}$ Line through (-3,5) making an angle of 120° with the positive x-axis.  $y = 5 + (x + 3) \tan 120°$ or $y = 5 + (x + 3)(-\sqrt{3})$
Intercept form	Line with x – intercept a and y – intercept b Equation of line: $\frac{x}{a} + \frac{y}{b} = 1$	Line with x – intercept 4 and y – intercept 8 Equation of line: $\frac{x}{4} + \frac{y}{8} = 1$
Standard form	$Ax + By = C$	Standard form of equation $y = -2x + 8$ is $2x + y = 8$
Parallel lines 	Line through (x_1,y_1) parallel to $y = mx + b$ Equation of line: $y - y_1 = m(x - x_1)$ (Same slope as given line.)	Line through (3,-5) parallel to $y = -2x + 8$ Equation of line: $y - (-5) = -2(x - 3)$ or $y + 5 = -2(x - 3)$
Perpendicular lines 	Line through (x_1,y_1) perpendicular to $y = mx + b$ Equation of line: $y - y_1 = -\frac{1}{m}(x - x_1)$ (Slope of perpendicular line is the negative reciprocal of the given line.)	Line through (3,-5) perpendicular to $y = -2x + 8$ Equation of line: $y - (-5) = \frac{1}{2}(x - 3)$ or $y + 5 = \frac{1}{2}(x - 3)$

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