

1. Find the equation of each line. (Answers in Slope-Point Form)
- (a) It has slope $-\frac{2}{3}$ and x-intercept 3. (b) It passes through (4, 5) and (-1, -1).
- ~~(c) It has y-intercept $\frac{3}{2}$ and slope -2. (d) It has slope $-\frac{1}{2}$ and x-intercept $\frac{2}{3}$.~~
- (e) It has slope 3 and passes through (4, 5).
- (f) It has slope 0 and passes through (2, -3).
- (g) It has an undefined slope and passes through (-1, 2).
2. Find the equation for the line that has the following properties. (Answers in General Form)
- (a) y-intercept -3, slope $\frac{2}{3}$ (b) parallel to $3x - y = 4$, y-intercept 5
- (c) perpendicular to $2x - y = 5$, passes through (-3, 0)
- (d) passes through (-2, 1), parallel to the x-axis
- ~~(e) x-intercept $\frac{2}{3}$, slope 3 (f) perpendicular to $y = 2x$, x-intercept $-\frac{1}{2}$~~
- ~~(g) A line is perpendicular to $y = 2x - 1$ and passes through (2, -3). Find its equation.~~
- ~~(h) A line has the same x-intercept as $2x + y = 8$ and passes through (0, 1). Find its equation.~~
- ~~(i) A line passes through (-4, 2) and has the same y-intercept as $2x - y = 3$. Find its equation.~~
3. Points A(-4, -3), B(-2, 3), and C(3, 0) are given.
- (a) Find the equation of the line AB. (Slope-Point Form)
- (b) Find the equation of the line through C perpendicular to AB. (General Form)
4. $\triangle PQR$ is given by the co-ordinates P(-4, 5), Q(3, 7), and R(0, -4).
- (a) Find the equation of the line through P and parallel to RQ. (Slope-Point Form)
- (b) Find the equation of the line through P, which is perpendicular to RQ. (Slope-Point Form)

$$1. a) m = -\frac{2}{3} \quad x\text{-int} = (3, 0)$$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = -\frac{2}{3}(x - 3)$$

$$y = -\frac{2}{3}(x - 3)$$

b)

$$\begin{array}{cc} x_1, y_1 & x_2, y_2 \\ (4, 5) & (-1, -1) \end{array}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-1 - 5}{-1 - 4}$$

$$m = \frac{-6}{-5}$$

$$m = \frac{6}{5}$$

$$y - y_1 = m(x - x_1)$$

$$y - 5 = \frac{6}{5}(x - 4)$$

e) $m = 3$ Point (x_1, y_1) $(4, 5)$

$$y - y_1 = m(x - x_1)$$

$$y - 5 = 3(x - 4)$$

f) $m = 0$ Point (x_1, y_1) $(2, -3)$

$$y - y_1 = m(x - x_1)$$

$$y + 3 = 0(x - 2)$$

or $\rightarrow y + 3 = 0$

$$g) m = \frac{1}{0} \quad \text{Point } (-1, 2)$$

$$y - y_1 = m(x - x_1)$$

$$\boxed{y - 2 = \frac{1}{0}(x + 1)}$$

#2.

$$a) b = -3 \quad m = \frac{2}{3}$$

$$y = \frac{2}{3}x - 3 \quad \rightarrow \text{General.}$$

$$\textcircled{3}y = 2x - 9$$

$$0 = 2x - 3y - 9$$

$$\boxed{2x - 3y - 9 = 0}$$

b) Parallel (Same Slope) y -int = 5.

$$\textcircled{3}x - y = 4$$

$$b = 5.$$

$$\frac{-y}{-1} = \frac{-3x + 4}{-1}$$

$$y = \textcircled{3}x - 4$$

$$m = 3$$

$$\textcircled{y} = 3x + 5 \rightarrow \text{General.}$$

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

$$\boxed{3x - y + 5 = 0}$$

c) Perp. (opp. rec. slope)

$$\textcircled{2X} - y = 5.$$

$$\frac{-y}{-1} = \frac{-2X + 5}{-1}$$

$$y = \textcircled{2X} - 5.$$

$$\downarrow$$

$$m = \frac{-1}{2}$$

$$m = \frac{-1}{2} \quad \text{Point } (-3, 0)$$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = \frac{-1}{2}(x + 3)$$

$$y \times 2 = \frac{-1 \times 2}{2}(x + 3)$$

$$2y = -1(x + 3)$$

$$2y = \textcircled{-1x} \textcircled{-3}$$

$$\boxed{1x + 2y + 3 = 0}$$

d) Point $(-2, 1)$ Parallel (Same Slope)

$$x\text{-axis} = 0$$

$$m = 0$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = 0(x + 2) \rightarrow \text{General.}$$

$$\boxed{y - 1 = 0}$$

g) Perp. $y = 2x - 1$ Point (x_1, y_1)
 $(2, -3)$

$$m = -\frac{1}{2}$$
$$y - y_1 = m(x - x_1)$$
$$y + 3 = -\frac{1}{2}(x - 2)$$
$$2y + 6 = -1(x - 2)$$
$$2y + 6 = -1x + 2$$
$$1x + 2y + 6 - 2 = 0$$
$$1x + 2y + 4 = 0$$

3.

$$a) \quad A \begin{matrix} x_1 & y_1 \\ (-4, -3) \end{matrix} \quad B \begin{matrix} x_2 & y_2 \\ (-2, 3) \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{3 - (-3)}{-2 - (-4)}$$

$$m = \frac{6}{2}$$

$$m = 3$$

$$y - y_1 = m(x - x_1)$$

$$y + 3 = 3(x + 4)$$

b) Perp to AB

Slope of AB = 3

$$m = -\frac{1}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y + 3 = -\frac{1}{3}(x + 4)$$

$$3y + 9 = -1(x + 4)$$

$$3y + 9 = -x - 4$$

$$1x + 3y + 9 + 4 = 0$$

$$1x + 3y + 13 = 0$$

4. a) Point $P(x_1, y_1)$ $(-4, 5)$ Parz (Same slope) $R(x_1, y_1)$ $(0, -4)$ $Q(x_2, y_2)$ $(3, 7)$

$$y - y_1 = m(x - x_1)$$

$$y - 5 = \frac{11}{3}(x + 4)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{7 - (-4)}{3 - 0}$$

$$m = \frac{11}{3}$$

b) Point $P(x_1, y_1)$ $(-4, 5)$ Per (opp/rec) RQ

$$y - y_1 = m(x - x_1)$$

$$y - 5 = \frac{-3}{11}(x + 4)$$

$$\text{Slope of } RQ = \frac{11}{3}$$

$$\text{Perpendicular} = \frac{-3}{11}$$

