KEY

Common Math 10
Lesson 6.5 ~ Slope-Point Form of the Equation for a Linear Function

Slope-Point form is the second of three forms of an equation for a linear function that we will look at.

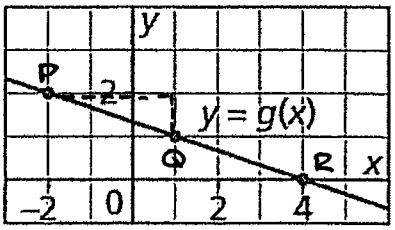
$$y - y_1 = m(x - x_1)$$

y *value of any point* x *value of the same point*

Example #1: Describe the graph of the linear function with the equation $y + 1 = -\frac{1}{2}(x - 2)$ (slope and one point).

$m = -\frac{1}{2}$ $P(2, -1)$

Example #2: Write an equation in slope-point form for this line, and then rewrite the equation in slope-intercept form.



$m = \frac{\text{rise}}{\text{run}} = -\frac{1}{3}$

$P(-2, 2)$ $Q(1, 1)$ $R(4, 0)$

with P: $y - 2 = -\frac{1}{3}(x + 2)$

with Q: $y - 1 = -\frac{1}{3}(x - 1)$

with R: $y = -\frac{1}{3}(x - 4)$

← slope-point form

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

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

$+2 \quad +2\ \frac{6}{3}$

$y = -\frac{1}{3}x + \frac{4}{3}$ ← slope-intercept form

Example #3: Write an equation for the line that passes through S(2, -3) and is:

a) parallel to the line $y = 3x + 5$

$m = 3$

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

b) perpendicular to the line $y = 3x + 5$

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

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

Example #4: A temperature in degrees Celsius, c, is a linear function of the temperature in degrees Fahrenheit, f. The boiling point of water is 100°C and 212°F. The freezing point of water is 0°C and 32°F.

a) Write a linear equation to represent the function.

$(f, c) \rightarrow (212, 100)$ & $(32, 0)$

$m = \frac{0 - 100}{32 - 212} = \frac{-100}{-180} \overset{\div 20}{=} \frac{5}{9}$

$\boxed{c = \frac{5}{9}(f - 32)}$ or $c - 100 = \frac{5}{9}(f - 212)$

b) Use the equation to determine the temperature in degrees Celsius at which iron melts, 2795°F.

$c = \frac{5}{9}(2795 - 32)$

$c = \frac{5}{9}(2763)$

$c = \boxed{1535°C}$