

6.5 Slope Point Form of Linear Eqn

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

we rewrite as $\frac{m}{1} = \frac{y_2 - y_1}{x_2 - x_1}$ and

cross multiply we get $y_2 - y_1 = m(x_2 - x_1)$

If we know the slope, m and some point on the line, (x_1, y_1) then this becomes $y - y_1 = m(x - x_1)$ which is the slope-point form of the equation of a line.

Ex: What is the equation of a line with slope $\frac{2}{3}$ and which passes through $(5, 8)$?

Using slope-point form we get

$$y - 8 = \frac{2}{3}(x - 5)$$

Ex: What is the equation of the line with slope -5 and passes through $(2, -3)$?

In slope-point form:

$$y - (-3) = -5(x - (2))$$

$$y + 3 = -5(x - 2)$$

Ex: what is the equation, in slope-point form, of the line which passes through $(-2, -4)$ and $(5, 3)$?

Solution: 1st calculate the slope!

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-4)}{5 - (-2)} = \frac{7}{7} = 1$$

$$y - (3) = \boxed{1}(x - (5))$$

$$y - 3 = x - 5$$

Ex: what is the equation, in slope-point form, of the line passing through $(-3, 4)$ and $(7, -2)$?

Ans: $y + 2 = -\frac{3}{5}(x - 7)$

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

Ex: What is the equation of the line passing through $(2, -3)$ which is parallel to $y = -\frac{1}{2}x + 3$?

Solution: for slope-point form we need: slope = $-\frac{1}{2}$ (same as parallel)
point = $(2, -3)$

so equation is: $y - (-3) = -\frac{1}{2}(x - 2)$

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

Ex: passes through $(5, 7)$ and is perpendicular to $y = 3x - 5$ $m = 3$

Solution: point is $(5, 7)$
slope is $-\frac{1}{3}$ (neg. recip since \perp)

$$y - 7 = -\frac{1}{3}(x - 5)$$

page 372 # 4, 5, 9, 11, 12, 14