

Warm Up



- 1) A line that passes through $(-7, 2)$ and $(3, -1)$
- Write an equation in point slope form:
 - Write an equation in slope intercept form:
 - State the x and y intercept

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

sign

$$= \frac{(-1) - (2)}{(3) + (7)}$$

$$m = \frac{-3}{10} \quad (-7, 2)$$

Point-slope

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

Point slope →

$$y - 2 = \frac{-3}{10}(x - (-7))$$

watch sign

$$y - 2 = \frac{-3}{10}\left(\frac{x}{1} + \frac{7}{1}\right)$$

$$y - 2 = \frac{-3x}{10} - \frac{21}{10}$$

$$y - 2 + 2 = \frac{-3}{10}x - \frac{21}{10} + \frac{2}{1}$$

Need c.o.

$$y = \frac{-3}{10}x - \frac{21}{10} + \frac{20}{10}$$

Slope intercept →

$$y = \frac{-3}{10}x - \frac{1}{10}$$

c) x-intercept (let y=0)

$$0 = \frac{-3}{10}x - \frac{1}{10}$$

$$0 + \frac{1}{10} = \frac{-3}{10}x - \frac{1}{10} + \frac{1}{10}$$

$$\frac{1}{10} = \frac{-3}{10}x$$

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

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

y intercept

let x=0

$$y = \frac{-3}{10}x - \frac{1}{10}$$

$$y = \frac{-3}{10}(0) - \frac{1}{10}$$

$$y = -\frac{1}{10}$$

Homework Solutions

$$\begin{aligned}
 1) \quad y - y_1 &= m(x - x_1) \\
 y - 8 &= 2(x - (-1)) \\
 y - 8 &= 2(x + 1) \\
 y - 8 &= 2x + 2 \\
 y - 8 + 8 &= 2x + 2 + 8 \\
 y &= 2x + 10
 \end{aligned}$$

$$\begin{aligned}
 2) \quad y - y_1 &= m(x - x_1) \\
 y - (-3) &= 4(x - 6) \\
 y + 3 &= 4(x - 6) \\
 y + 3 &= 4x - 24 \\
 y + 3 - 3 &= 4x - 24 - 3 \\
 y &= 4x - 27
 \end{aligned}$$

$$\begin{aligned}
 3) \quad y - y_1 &= m(x - x_1) \\
 y - (-6) &= \frac{3}{4}(x - (-1)) \\
 y + 6 &= \frac{3}{4}(x + 1) \\
 y + 6 &= \frac{3x + 3}{4} \\
 y + 6 - 6 &= \frac{3x + 3}{4} - 6 \\
 y &= \frac{3x + 3}{4} - \frac{24}{4} \\
 y &= \frac{3x - 21}{4}
 \end{aligned}$$

$$\begin{aligned}
 4) \quad y - y_1 &= m(x - x_1) \\
 y - 1 &= -3(x - (-1)) \\
 y - 1 &= -3(x + 1) \\
 y - 1 &= -3x - 3 \\
 y - 1 + 1 &= -3x - 3 + 1 \\
 y &= -3x - 2
 \end{aligned}$$

$$\begin{aligned}
 6) \quad m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 m &= \frac{1 - (-2)}{(-4) - (3)} \\
 m &= \frac{1 + 2}{(-4) - (3)} \\
 m &= \frac{3}{-7}
 \end{aligned}$$

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 y - (-2) &= \frac{3}{-7}(x - 3) \\
 y + 2 &= \frac{3(x - 3)}{-7} \\
 y + 2 &= \frac{-3x + 9}{7} \\
 y + 2 - 2 &= \frac{-3x + 9}{7} - \frac{2}{7} \\
 y &= \frac{-3x + 9}{7} - \frac{14}{7} \\
 y &= \frac{-3x - 5}{7}
 \end{aligned}$$



6.6 General Form of the Equation for a Linear Relation

LESSON FOCUS

Relate the graph of a linear function to its equation in general form.

Make Connections

A softball team may field any combination of 9 female and male players. There must be at least one female and one male on the field at any time. What are the possible combinations for female and male players on the field?



Linear Equations

**Slope
Intercept Form**

$$y = mx + b$$

**Point Slope
Form**

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

Two other forms of Linear Equations

Standard

$$Ax + By = C$$

- Where A, B and C are integers

Example:

$$2x + 7y = 10$$

General

$$Ax + By + C = 0$$

General Form of the Equation of a Linear Relation

$Ax + By + C = 0$ is the general form of the equation of a line, where A is a whole number, and B and C are integers.

Example:

$$2x + 7y - 10 = 0$$

Point - Slope to General Form

point (x_1, y_1)
 $(6, 3)$

$$m = \frac{2}{5}$$

Method 1: distribute through

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

$$y - 3 = \frac{2}{5}(x + 6)$$

$$y - 3 = \frac{2x}{5} + \frac{12}{5}$$

$$y^{(5)} - 3^{(5)} = \frac{2^{(5)}x}{5} + \frac{12^{(5)}}{5}$$

$$5y - 15 = 2x + 12$$

$$\cancel{5y} - 15 = 2x - \cancel{5y} + 12$$

$$-15 = 2x - 5y + 12$$

$$\cancel{-15} + 15 = 2x - 5y + 12 + 15$$

$$0 = 2x - 5y + 27$$

General

Point - Slope to General Form

Method 2: Get rid of denominator by multiplying each side by denominator

$$5x(y - 3) = \left[\frac{2}{5}(x + 6) \right] \times 5$$

$$5(y - 3) = 2(x + 6)$$

$$5y - 15 = 2x + 12$$

↳

$$5y - 15 = 2x + 12 + 15$$

$$0 = 2x - 5y + 27$$

You try

Point - Slope to General Form

$$y + 6 = \frac{-3}{7} (x - 2)$$

$$y + 6 = \frac{-3x}{7} + \frac{6}{7}$$

$$y + 6 = -\frac{3}{7}x + \frac{6}{7}$$

$$7y + 42 = -3x + 6$$

$$7y + 42 = -3x + 6$$

$$3x + 7y + 42 = 6 - 6$$

$$3x + 7y + 36 = 0$$

Slope Intercept to

General Form

3) a) $y = -\frac{2}{3}x + 4$ (3)

$3y = -2x + 12$

$2x + 3y - 12 = 0$

General Form to Slope Intercept

$y = mx + b$

$$7x - 2y + 18 = 0$$

step 1) Locate y and take it to the side so it is positive

$$\cancel{7x} - 2y + 18 = 0 - \cancel{7x}$$

$$-2y + 18 = -7x$$

$$-2y + 18^{-18} = -7x - 18$$

$$-2y = -7x - 18$$

$$\frac{-2y}{-2} = \frac{-7x}{-2} - \frac{18}{-2}$$

$$y = \frac{7}{2}x + 9$$



$$5a) \quad 8x - 3y = 24$$

x intercept

let $y=0$

$$8x - 3y = 24$$

$$8x - \cancel{3(0)} = 24$$

$$8x - 0 = 24$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$x = 3$$

y intercept

let $x=0$

$$8x - 3y = 24$$

$$\cancel{8(0)} - 3y = 24$$

$$\frac{-3y}{-3} = \frac{24}{-3}$$

$$y = -8$$