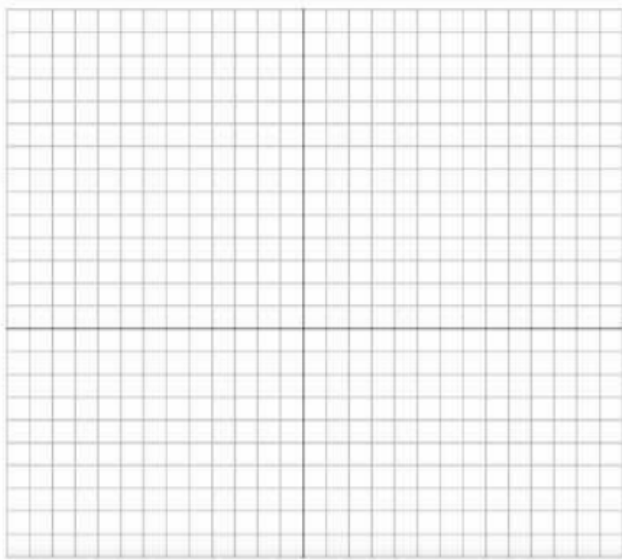


Warm-up

Do now

Slope = $\frac{1}{4}$ $\left| \frac{\Delta y}{\Delta x} \right.$

$\frac{\uparrow 1^\circ \text{F}}{\uparrow 4} \quad \frac{2}{8} = \frac{3}{12}$
 $\frac{4}{16} = \frac{5}{20}$



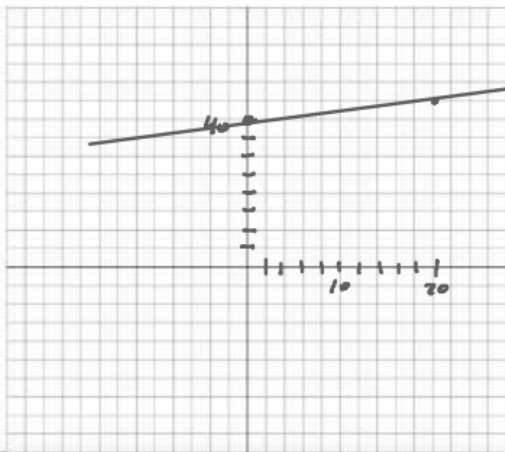
y-intercept
↓

The equation $T = \frac{1}{4}n + 40$ is used to estimate the temperature in degrees Fahrenheit, T , based on the number of cricket chirps, n , in one minute.

1. (a) Estimate the temperature when there are no chirps. 40°F
2. (b) Estimate the temperature when the number of chirps in one minute is 100. $\frac{1}{4}(100) + 40 = 65^\circ \text{F}$
3. (c) Interpret the slope and T-intercept of the equation.

At 40°F there are no chirps

4. (d) Graph the equation. Every degree increase in $^\circ \text{F}$ the number of chirps will increase by 4.



Parallel Lines

Lines in same plane that never intersect
Same Slope.

Use slopes and y-intercepts to determine if the lines $3x - 2y = 6$ and $y = \frac{3}{2}x + 1$ are parallel?

$$m = -\frac{A}{B}$$

$$m = \frac{-3}{-2} = \frac{3}{2}$$

$$m = \frac{3}{2}$$

Parallel

Use slopes and y-intercepts to determine if the lines $2x + 5y = 5$ and $y = -\frac{2}{5}x - 4$ are parallel?

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

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

parallel

||

Use slopes and y-intercepts to determine if the lines $y = -\frac{1}{2}x - 1$ and $3x - 2y = 6$ are parallel?

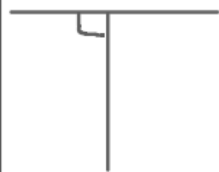
$$m = -\frac{1}{2}$$

$$m = \frac{3}{2}$$

Not Parallel

~~||~~

Perpendicular Lines



Lines that intersect to form right angles. Slopes are opposite

reciprocals

$$\left(\frac{1}{m_1}\right) (-m_2) = -1$$

Use the slopes to determine if the lines, $y = -5x - 4$ and $x - 5y = 5$ are perpendicular.

$$m = -5$$

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

⊥

Use the slopes to determine if the lines, $y = -3x + 2$ and $x + 3y = 4$ are perpendicular.

$$m = -3$$

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

Not ⊥

Use the slopes to determine if the lines, $y = 2x - 5$ and $x + 2y = -6$ are perpendicular.

$$m = 2$$

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

⊥

What you will learn about:
Writing the Equation of a Line

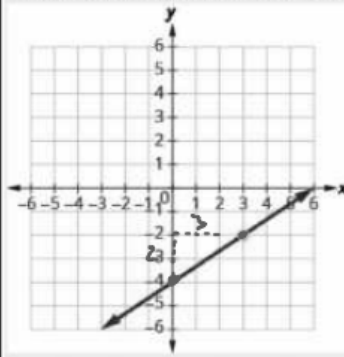
Equation of a line
 $y = mx + b$

Find an equation of a line with slope -1 and y-intercept (0, -3)

$m = -1$ $b = -3$

$$y = -x - 3$$

Find the equation of the line shown.



$b = -4$
 $m = \frac{2}{3}$

$$y = \frac{2}{3}x - 4$$

Equation of a line given 2 points and a slope

Point-Slope Form

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

$m = \text{slope}$

$(x_1, y_1) \rightarrow$ Given point

Find an equation of a line with slope $m = \frac{2}{5}$ that contains the point $(10, 3)$. Write the equation in slope-intercept form.

pt-slope
 $y - 3 = \frac{2}{5}(x - 10)$

$$y - 3 = \frac{2}{5}x - 4$$

$$y = \frac{2}{5}x - 1$$

Slope-Inter

$$y = \frac{2}{5}x - 1$$

$$y = mx + b$$

$$3 = \frac{2}{5}(10) + b$$

$$3 = 4 + b$$

$$b = -1$$

Find an equation of a line with slope $m = \frac{5}{6}$ that contains the point $(6, 3)$. Write the equation in slope-intercept form.

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

$$3 = \frac{5}{6}(6) + b$$

$$3 = 5 + b$$

$$y - 3 = \frac{5}{6}x - 5$$

$$y = \frac{5}{6}x - 2$$

$$-2 = b$$

$$y = \frac{5}{6}x - 2$$

HOW TO

Find an equation of a line given the slope and a point.

Step 1. Identify the slope.

Step 2. Identify the point.

Step 3. Substitute the values into the point-slope form, $y - y_1 = m(x - x_1)$.

Step 4. Write the equation in slope-intercept form.

Find an equation of a line with slope $m = -\frac{1}{3}$ that contains the point (6, -4). Write the equation in slope-intercept form.

$$y + 4 = -\frac{1}{3}(x - 6) \qquad y = -\frac{1}{3}x - 2$$

$$y + 4 = -\frac{1}{3}x + 2$$

Find an equation of a line with slope $m = -\frac{2}{5}$ that contains the point (10, -5). Write the equation in slope-intercept form.

$$y + 5 = -\frac{2}{5}(x - 10) \qquad y = -\frac{2}{5}x - 1$$

$$y + 5 = -\frac{2}{5}x + 4$$

$$m = 0$$

Find the equation of a horizontal line that contains the point (-1, 2). Write the equation in slope-intercept form.

$$y - 2 = 0(x + 1)$$

$$y - 2 = 0 \qquad y = 2$$

$$m = 0$$

Find the equation of a horizontal line that contains the point (-3, 8). Write the equation in slope-intercept form.

$$y - 8 = 0(x + 3)$$

$$y - 8 = 0 \qquad y = 8$$

Find an equation of a line that contains the points (5, 4) and (3, 6). Write the equation in slope-intercept form.