

do

Write an equation for the line in slope-intercept form.

slope = $-\frac{1}{3}$ passing through the point (9, -5)

$$y + 5 = -\frac{1}{3}(x - 9) \quad x_1, y_1$$

$$y + 5 = -\frac{1}{3}x + 3$$

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

You do

Write an equation for the line in slope-intercept form.

slope = $-\frac{1}{5}$ passing through the point (10, -2)

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

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

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

Find the equation of the line through the points (-2, 5) and

(-6, -3) $m = \frac{-3 - 5}{-6 - 2} = \frac{-8}{-4} = 2$ x_1, y_1

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

$$y - 5 = 2x + 4$$

$$\boxed{y = 2x + 9}$$

Find the equation of the line through the points (2, 2) and

(-1, -4) $m = \frac{-4 - 2}{-1 - 2} = \frac{-6}{-3} = 2$

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

$$y - 2 = 2x - 4$$

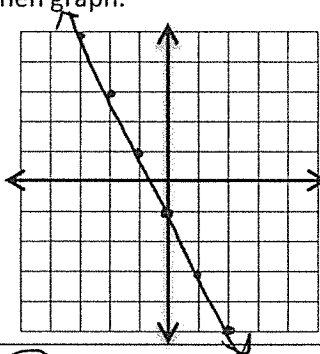
$$\boxed{y = 2x - 2}$$

Find the slope and y-intercept. Then graph.

$$\begin{array}{r} -2x - y = 1 \\ +2x \quad +2x \\ \hline -y = 2x + 1 \\ -1 \quad -1 \quad -1 \\ \hline y = -2x - 1 \end{array}$$

$$\boxed{y = -2x - 1}$$

slope = -2
y-intercept = $(0, -1)$

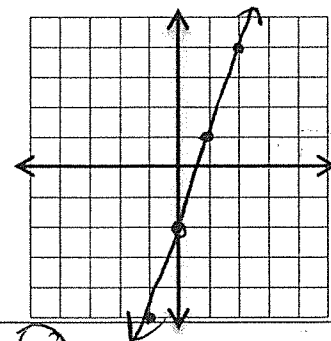


Find the slope and y-intercept. Then graph.

$$\begin{array}{r} 3x - y = 2 \\ -3x \quad -3x \\ \hline -y = -3x + 2 \\ -1 \quad -1 \quad -1 \\ \hline y = 3x - 2 \end{array}$$

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

slope = 3
y-intercept = $(0, -2)$



Are the lines $3x + 4y = 5$ and $y = -\frac{3}{4}x + 1$ parallel,

perpendicular, or neither?

$$3x + 4y = 5$$

$$4y = -3x + 5$$

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

slopes are both $-\frac{3}{4}$

parallel

Are the lines $2x - 3y = 2$ and $y = \frac{3}{2}x - 1$ parallel,

perpendicular, or neither?

$$2x - 3y = 2$$

$$-3y = -2x + 2$$

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

slopes are $\frac{2}{3}, \frac{3}{2}$

perpendicular

Find the equation of the line that is parallel $y = -2x + 1$ to and goes through $(-3, 2)$.

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

$$y - 2 = -2x - 6$$

$$\boxed{y = -2x - 4}$$

Find the equation of the line that is parallel $y = 3x - 2$ to and goes through $(5, -1)$.

$$y + 1 = 3(x - 5)$$

$$y + 1 = 3x - 15$$

$$\boxed{y = 3x - 16}$$

Find the equation of the line that is perpendicular to $y = -2x + 1$ and goes through $(-3, 2)$.

old slope = -2
new slope = $\frac{1}{2}$

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

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

+2 +2 = $\frac{4}{2}$

$$y = \frac{1}{2}x + \frac{7}{2}$$

Find the equation of the line that is perpendicular to $y = 3x - 2$ and goes through $(5, -1)$.

old slope = 3
new slope = $-\frac{1}{3}$

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

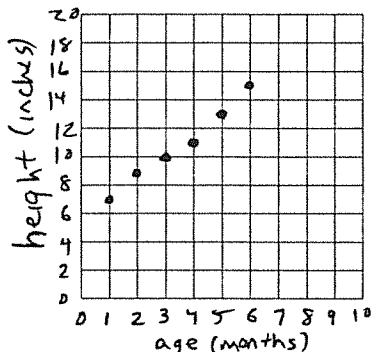
$$y + 1 = -\frac{1}{3}x + \frac{5}{3}$$

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

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

Here is some data on terrier heights (months vs. inches).

Age	Height
1	7
2	9
3	10
4	11
5	13
6	15



a) Does this seem like a linear relationship?

yes - very!!

b) Use the points $(1, 7)$ and the point $(5, 13)$ to find the equation of a line through the data.

$$m = \frac{13 - 7}{5 - 1} = \frac{6}{4} = \frac{3}{2}$$

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

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

+7 +7 = $\frac{14}{2}$

$$y = \frac{3}{2}x + \frac{11}{2}$$

c) Explain the meaning of the slope in the context of this problem.

$$\frac{3}{2}$$

every time 2 months go by, the height goes up by 3 inches

d) Explain the meaning of the y-intercept in the context of this problem.

$$(0, \frac{11}{2})$$

When terriers are born, they are $5\frac{1}{2}$ inches high

e) Predict the height of a terrier when the dog is 25 months old. What do you make of this result?

$$y = \frac{3}{2}(25) + \frac{11}{2}$$

$$= \frac{75}{2} + \frac{11}{2}$$

$$= \frac{86}{2} = 43 \text{ inches}$$

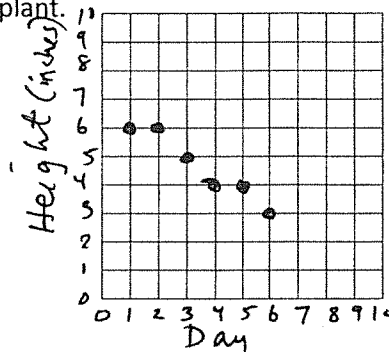
This doesn't make sense. Terriers aren't ever that tall!

(= 3 feet, 7 inches!)

The data is only linear for a while - it must flatten out as the dogs stop growing

Here is some data on showing what happens when Mr. Simon takes care of a plant.

Day	Height
1	6
2	6
3	5
4	4
5	4
6	3



a) Does this seem like a linear relationship?

yes

b) Use the points $(1, 6)$ and the point $(5, 4)$ to find the equation of a line through the data.

$$m = \frac{4 - 6}{5 - 1} = \frac{-2}{4} = -\frac{1}{2}$$

$$y - 6 = -\frac{1}{2}(x - 1)$$

$$y - 6 = -\frac{1}{2}x + \frac{1}{2}$$

+6 +6

$$y = -\frac{1}{2}x + 6\frac{1}{2}$$

c) Explain the meaning of the slope in the context of this problem.

$$-\frac{1}{2} = \frac{\text{rise}}{\text{run}} = \frac{\text{height}}{\text{days}}$$

every 2 days, the height drops by 1 inch

d) Explain the meaning of the y-intercept in the context of this problem.

$$(0, 6\frac{1}{2})$$

When Mr. Simon started taking care of the plant, it was $6\frac{1}{2}$ inches tall

e) Predict the value of the height when the plant has been watered by Mr. Simon for 20 days. What do you make of this result?

$$y = -\frac{1}{2}x + 6\frac{1}{2}$$

$$y = -\frac{1}{2}(20) + 6\frac{1}{2}$$

$$= -10 + 6\frac{1}{2}$$

$$= -3\frac{1}{2} \text{ inches}$$

This doesn't make any sense. Plants can't be negative heights!

The data stops being linear at height