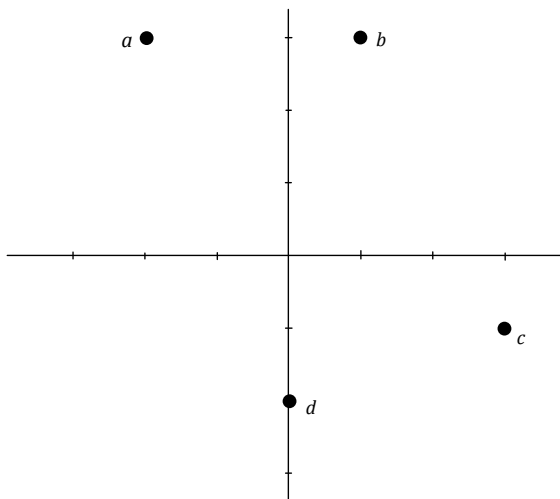


1. **(4 pts)** Draw a set of axes in the coordinate plane, and then plot and label the following points:
 $a = (-2, 3)$, $b = (1, 3)$, $c = (3, -1)$, $d = (0, -2)$.



Spring 2014/q5-1.pdf

2. Suppose your pet dog weighed 2 pounds at birth, and weighed 10 pounds after two years.
- (a) **(3 pts)** Based on these two data points find a linear function that describes how weight varies with age.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 2}{2 - 0} = 4.$$

Since one of the points is $(0, 2)$, the y -intercept is $b = 2$, so the equation becomes

$$y = 4x + 2.$$

- (b) **(3 pts)** Use this function to find how much your dog will weigh when it's 5 years old?

$$y = 4 \cdot 5 + 2 = 22.$$

3. A snowplow has a maximum speed of 30 miles per hour on a dry highway. Its maximum speed decreases by 1.2 miles per hour for every inch of snow on the highway.

(a) **(3 pts)** Write a linear function to model the situation described.

Here the y -intercept is $b = 30$, and the rate of change (the slope) is $m = -1.2$. So the equation becomes

$$y = -1.2x + 30.$$

(b) **(3 pts)** Use this function to find how deep the snow is if the snowplow's maximum speed is 8 miles per hour.

$$8 = -1.2 \cdot x + 30$$

$$1.2 \cdot x = 30 - 8$$

$$x = \frac{22}{1.2} = 18.33.$$

4. **(Extra Credit: 4 pts)** Solve for x in $12^{x/4} = 1,000$. (*Hint: $\log_{10} a^b = b \cdot \log_{10} a$.*)

We just take log of both sides:

$$\log_{10} \left(12^{x/4} \right) = \log_{10} 1,000$$

$$\frac{x}{4} \cdot \log_{10} 12 = 3$$

$$x = \frac{4 \cdot 3}{\log_{10} 12} = 11.12.$$