

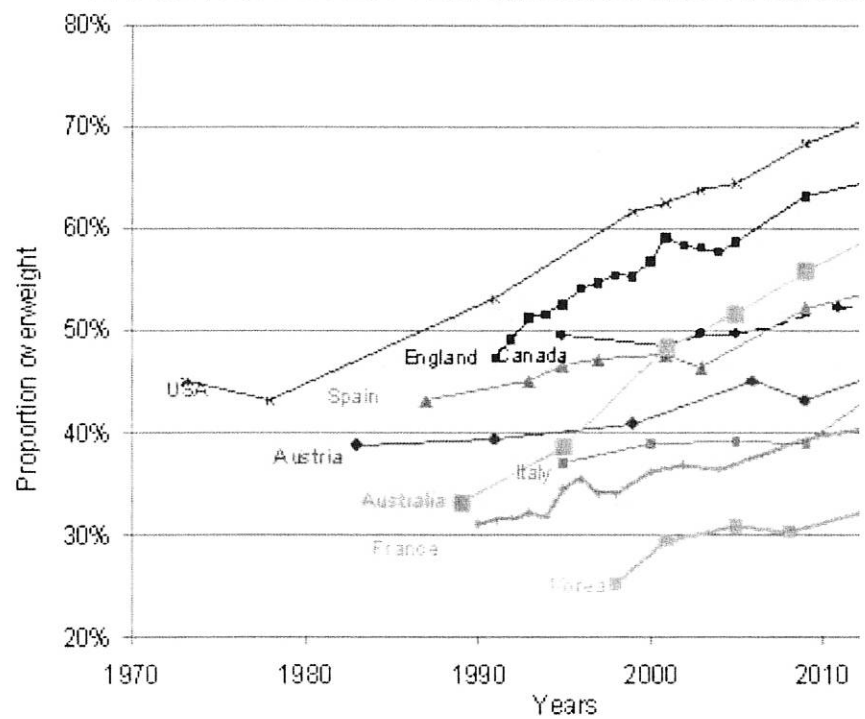
Name: key

Problem Set 2.2

1) The graph below shows the percentage of the population in various countries that are overweight; this includes both those that are overweight (BMI>25) and obese (BMI>30).

Source: Global Nutrition Market, Obesity and World Health. Global Sherpa, n.d. Web. 25 Feb. 2013. <<http://www.globalsherpa.org/nutrition-market-obesity-malnutrition>>.

Past and projected future overweight rates in selected O.E.C.D.



a) The graph is cut off at about 2013. Based on the portion of the graph that is shown, about what percentage of the US population do you think will be overweight in 2020?
around 75%

b) *multiple answers accepted as long as your argument works.*
What percentage of the US population do you think will be overweight in 2100?
Show how you arrived at your answer and analyze it in the given context.

*(1980, 43%)
(2010, 70%)*

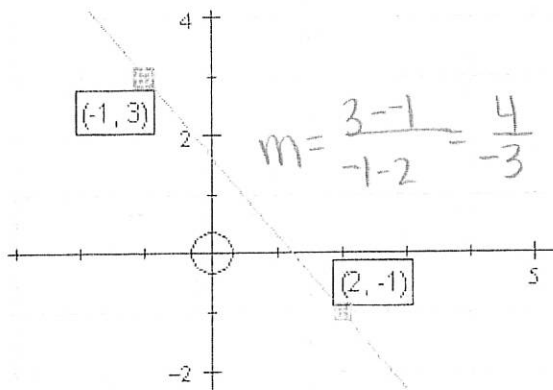
growth is about
$$\frac{70\% - 43\%}{2010 - 1980} = \frac{27\%}{30} = \frac{9\%}{10 \text{ years}}$$

Therefore from 2020
$$75\% + 9\% \cdot 8 = \boxed{131\%}$$

80 years
2100
$$\frac{9\%}{\text{year}} \cdot 8 \text{ years}$$

In 2-4 below, find an equation for the line through the two given points in $y - k = a(x - h)$ form.

2)

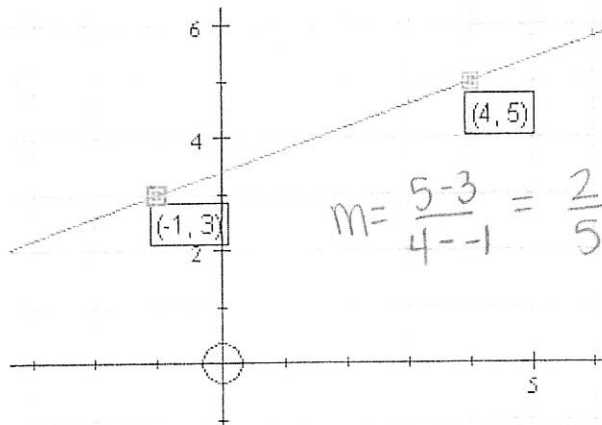


$$y - 3 = -\frac{4}{3}(x + 1)$$

or

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

3)

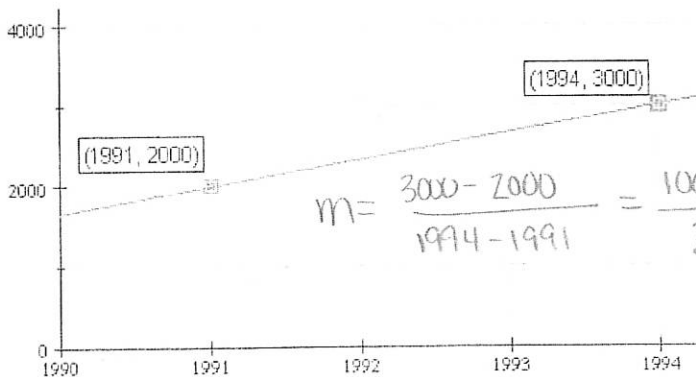


$$y - 5 = \frac{2}{5}(x - 4)$$

OR

$$y - 3 = \frac{2}{5}(x + 1)$$

4)



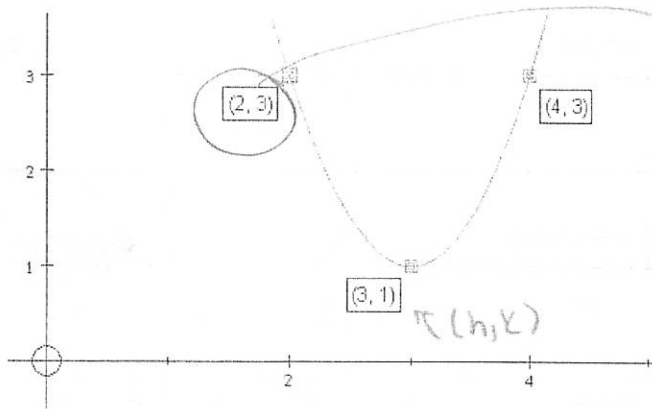
$$y - 3000 = \frac{1000}{3}(x - 1994)$$

OR

$$y - 2000 = \frac{1000}{3}(x - 1991)$$

In 5-7, below, find an equation for the parabola that goes through the three given points in $y - k = a(x - h)^2$ form.

5)



$$y - 1 = a(x - 3)^2$$

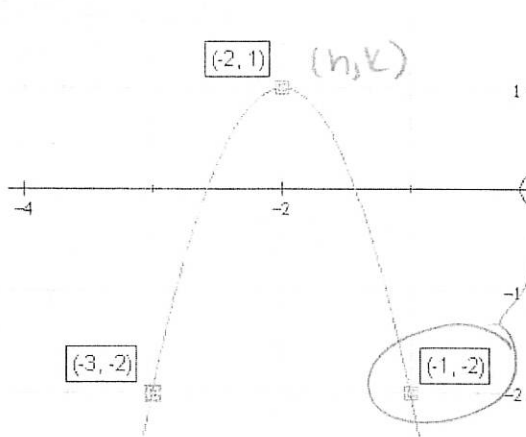
$$3 - 1 = a(2 - 3)^2$$

$$2 = a(1)$$

$$a = 2$$

$$y - 1 = 2(x - 3)^2$$

6)



$$y - 1 = a(x + 2)^2$$

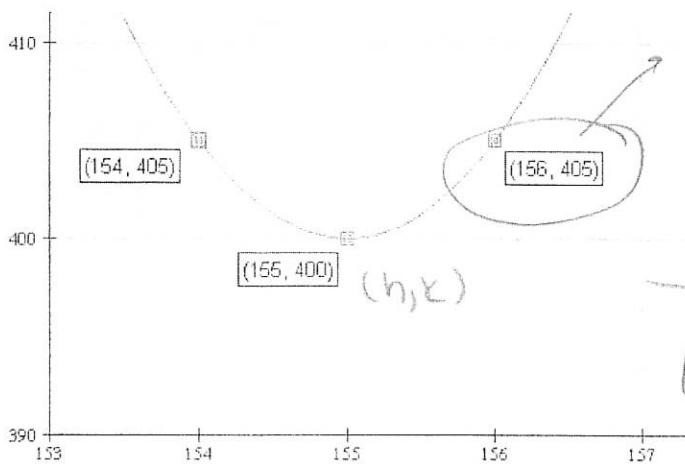
$$-2 - 1 = a(-1 + 2)^2$$

$$-3 = a(1)$$

$$a = -3$$

$$y - 1 = -3(x + 2)^2$$

7)



$$y - 400 = a(x - 155)^2$$

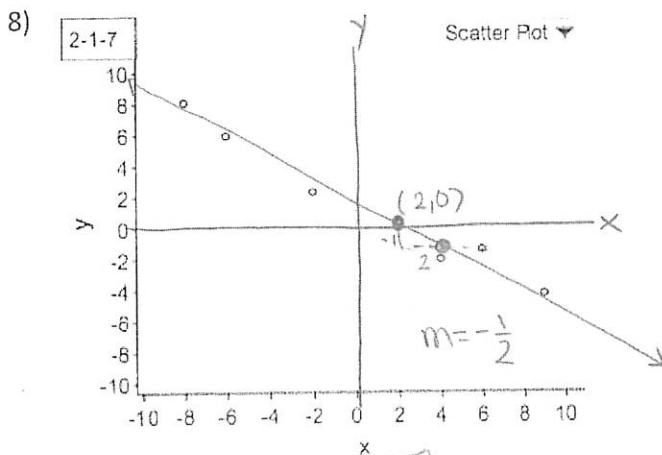
$$405 - 400 = a(156 - 155)^2$$

$$5 = a(1)$$

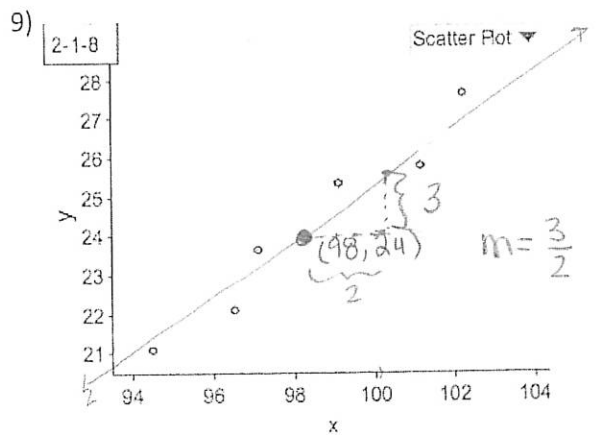
$$5 = a$$

$$y - 400 = 5(x - 155)^2$$

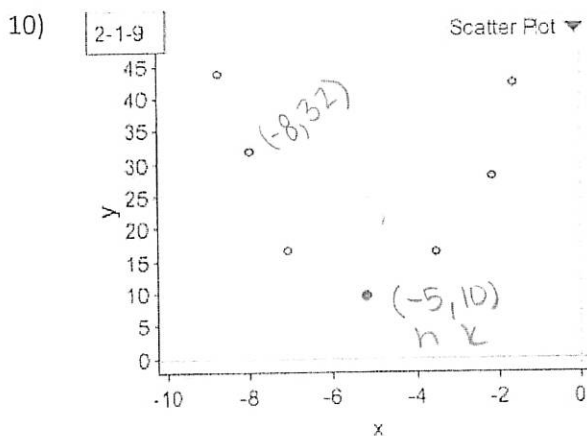
In 8-11, find an equation of a line in $y - k = a(x - h)$ form or a parabola in $y - k = a(x - h)^2$ form that models the given scatterplots.



$$y - 0 = -\frac{1}{2}(x - 2)$$



$$y - 24 = \frac{3}{2}(x - 98)$$



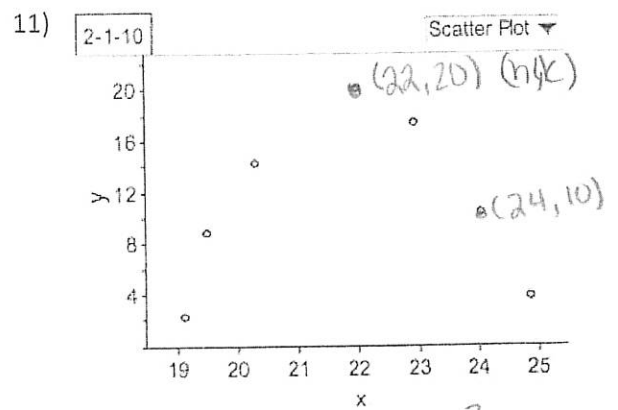
$$y - 10 = a(x + 5)^2$$

$$32 - 10 = a(-8 + 5)^2$$

$$22 = a(9)$$

$$2.5 \approx \frac{22}{9} = a$$

$$y - 10 = 2.5(x + 5)^2$$



$$y - 20 = a(x - 22)^2$$

$$10 - 20 = a(24 - 22)^2$$

$$-10 = a(4)$$

$$-2.5 = a$$

$$y - 20 = -2.5(x - 22)^2$$

12) Consider the scatterplot below of the height (in cm) vs. age (in months) of children in Kalama, Egypt.

a. Find an equation of a line in $y - k = a(x - h)$ form that models the scatterplot below.

$$y - 80 = \frac{1}{2}(x - 24)$$

b. Write a complete sentence that gives the meaning of the slope, a , in the context of the data set.

According to the linear model above we can expect an average increase of $\frac{1}{2}$ cm of height every month for a child in Kalama, Egypt.

c. Write a complete sentence that gives the meaning of the point (h,k) , in the context of the data set.

The point $(24,80)$ represents a height of 80 cm for a 24 month old child.

