y-int b=30   slope   m=3

1. Your family spends $30 for tickets to the aquarium and $3 per hour for parking. Write an equation in slope-intercept form that gives the total cost of your family's visit to the aquarium as a function of the number of hours that you are there. Find the total cost of 4 hours at the aquarium.
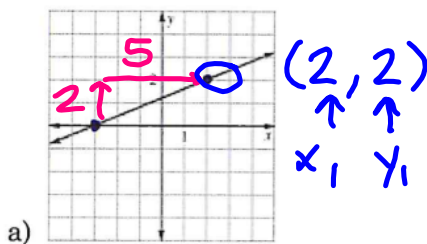
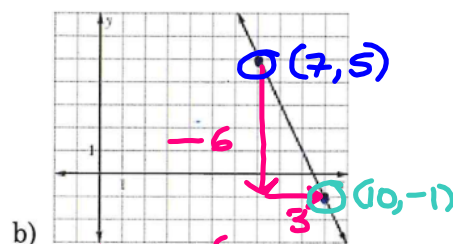$$y = 3x + 30$$

$$c(x) = 3x + 30$$

$$c(4) = 3(4) + 30$$

$$\boxed{c(4) = \$42}$$

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

2. Write an equation in point-slope form of the line shown in each graph below.

a)

5
2
(2, 2)
↑ ↑
x_1 y_1

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

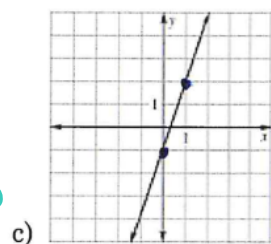$$y - 2 = \frac{2}{5}(x - 2)$$

b)

(7, 5)

−6

(10, −1)

3

$$m = -\frac{6}{3} = -2$$

$$y - 5 = -2(x - 7)$$

OR

$$y + 1 = -2(x - 10)$$

c)

3. Write an equation in (point-slope form) of the line that passes through $(-5, -19)$ and $(5, 13)$.

$$x_1 \ y_1 \qquad x_2 \ y_2$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{13 + 19}{5 + 5} = \frac{32}{10} = \frac{16}{5}$$
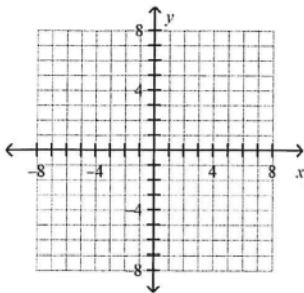
$$y + 19 = \frac{16}{5}(x + 5)$$

OR

$$y - 13 = \frac{16}{5}(x - 5)$$
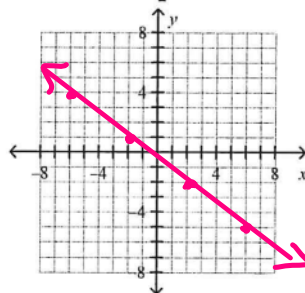
4. Graph each equation below.

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

$$y - -3 = 2(x - -4)$$

a) $y - 5 = -3(x - 1)$
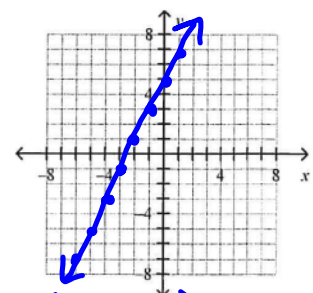
b) $y - 1 = -\frac{3}{4}(x + 2)$

$(-2, 1)$

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

c) $y + 3 = 2(x + 4)$

$(-4, -3)$

$m = 2 \text{ or } \frac{2}{1}$

y-int   slope $m = \dfrac{\Delta y}{\Delta x}$

5. A school district pays an installation fee and a monthly fee for Internet service. The table below shows the total cost of Internet service for the school district over different numbers of months.

$+2$ $+2$ $+2$ $+2$ $+2$

Months of Service	2	4	6	8	10	12
Total Cost ($)	9,378	12,806	16,234	19,662	23,090	26,518

$\Delta x = 2$

$\Delta y = 3428$

5950 -3428 $+3428$ $+3428$ $+3428$ $+3428$ $+3428$

a) Explain why the situation can be modeled by a linear equation.

It's increasing by the same amount ea. month.

b) What is the installation fee?

$5950

c) What is the monthly fee?

$1714

$m = \dfrac{\Delta y}{\Delta x} = \dfrac{3428}{2}$

$m = 10,000$

6. During the period 1994-2004, the annual sales of a small company increased by ⟨$10,000 per year⟩. In 1997 the annual sales were $97,000.

↳ year 3 $y = mx + b$ (3, 97000)   slope

a) Write an equation in slope-intercept form that gives the annual sales as a function of the number of years since 1994. **year 0**

$y - y_1 = m(x - x_1)$
$y - 97000 = 10000(x - 3)$
$y - 97000 = 10000x - 30000$
$\underline{+97000 \qquad\qquad\qquad +97000}$
$y = 10,000x + 67,000$

b) Find the sales in 2000.

↳ year 6

$127,000

$y = 10,000(6) + 67,000$

7. From 1990 to 2001 in Boston, Massachusetts, the annual excess fuel (in gallons per person) consumed due to traffic delays increased by about 1.4 gallons per person per year. In 1995 each person consumed about 37 gallons of excess fuel.

   (5, 37)   slope $m = 1.4$

   a) Write an equation in slope-intercept form that gives the annual excess fuel (in gallons per person) as a function of the number of years since 1990.

   $$y - y_1 = m(x - x_1)$$
   $$y - 37 = 1.4(x - 5)$$
   $$y - 37 = 1.4x - 7$$
   $$+37 +37$$
   $$y = 1.4x + 30$$

   b) How much excess fuel was consumed per person in 2001?   Year 11

   $$y = 1.4(11) + 30$$
   $$y = 15.4 + 30$$
   $$y = 45.4 \text{ gallons}$$

8. A news article reads as follows:

   "From 1970 to 2000, the number of Sunday newspapers in circulation increased at a relatively constant rate of 11.8 newspapers per year. In 1997 there were 903 Sunday newspapers in circulation."

   $m = 11.8$ Year 27   (27, 903)

   a) About how many Sunday newspapers were in circulation in 1970?   Year 0

   about 584 newspapers

   b) Write an equation in slope-intercept form that gives the number of Sunday newspapers in circulation as a function of the number of years since 1970.

   $$y - y_1 = m(x - x_1)$$
   $$y - 903 = 11.8(x - 27)$$
   $$y - 903 = 11.8x - 318.6$$
   $$+903 +903$$
   $$y = 11.8x + 584.4$$

   c) About how many Sunday newspapers were in circulation in 2000?   Year 30

   $$y = 11.8(30) + 584.4$$
   $$y = 938.4$$
   about 938 newspapers

9. From 1990 to 2001, the number of airports in the United States increased at a relatively constant rate of 175 airports per year. There were 19,306 airports in the United States in 2001.

$m = 175$

$(11, 19306)$

a) How many U.S. airports were there in 1990?

Year 0

17,381 airports

b) Write an equation in slope-intercept form that gives the number of U.S. airports as a function of the number of years since 1990.

$$y - 19306 = 175(x - 11)$$
$$y - 19306 = 175x - 1925$$
$$\underline{+ 19306 \qquad\qquad + 19306}$$
$$y = 175x + 17,381$$

c) Find the year in which the number of U.S. airports reached 19,200.   y-value

$$19,200 = 175x + 17,381$$
$$\underline{-17,381 \qquad\qquad -17,381}$$
$$\frac{1819}{175} = \frac{175x}{175}$$

$$x = 10.394\ldots \rightarrow \boxed{2000}$$