

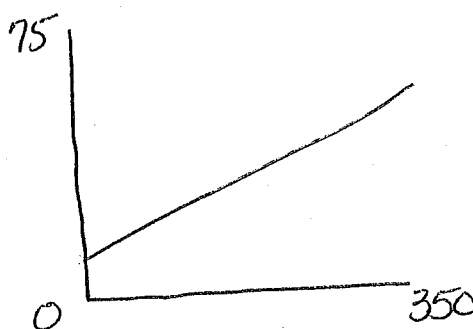
Ella works as a server at Pietro's Restaurant. The restaurant owners have a policy of automatically adding a 15% tip on all customers' bills as a courtesy to their servers. Ella works the 4 p.m. to 10 p.m. shift. She is paid \$15 per shift plus tips.

- a. Write a rule for Ella's evening wage based on the total of her customers' bills. Use your graphing calculator or computer software to produce a table and a graph of this function.

$W$  = Ella's wage  
 $B$  = customers' bills

$$W = 15 + .15B$$

x	$y = 15 + .15x$
0	15
50	22.5
100	30
150	37.5
200	45



- b. If the customers' bills total \$310, how much will Ella earn?

$$W = 15 + .15(310)$$

$$W = \$61.50$$

Check:

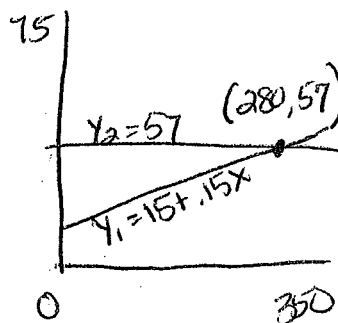
x	$y = 15 + .15x$
309	61.35
310	61.50
311	61.65

- c. Write and solve an equation to answer the question, "If Ella's wage last night was \$57, what was the total for her customers' bills?"

Equation:  $57 = 15 + .15B$  or

$$\begin{array}{r} -15 \quad -15 \\ \hline 42 = .15B \\ \hline .15 \quad .15 \\ \hline 280 = B \end{array}$$

x	$y = 15 + .15x$
279	56.85
280	57
281	57.15



The total for her customers' bills was \$280.

Victoria can earn as much as \$450 as a scorekeeper for a summer basketball league. She learned that she must pay \$18 per game for substitutes when she misses a game. So, her summer earnings  $E$  will depend on the number of games she misses  $g$  according to the function  $E = 450 - 18g$ . Solve each of the following equations and explain what the solutions tell you about Victoria's summer earnings.

Algebraically

a.  $306 = 450 - 18g$   
 $-450 \quad -450$

$$\frac{-144}{-18} = \frac{-18g}{-18}$$

$$8 = g$$

Victoria missed 8 games when she earns \$306.

Check:  $306 = 450 - 18(8)$   
 $306 = 306$

8. Solve the following inequality in two ways and check:  $25 \leq 13 + 3x$

$$25 \leq 13 + 3x$$

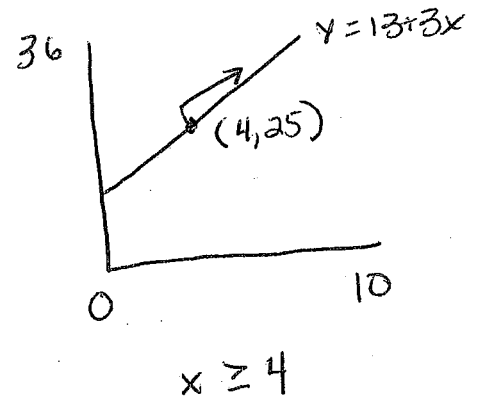
$$-13 \quad -13$$

$$\frac{12}{3} \leq \frac{3x}{3}$$

$$4 \leq x$$

x	y = 13 + 3x
3	22
4	25
5	28

$x \geq 4$



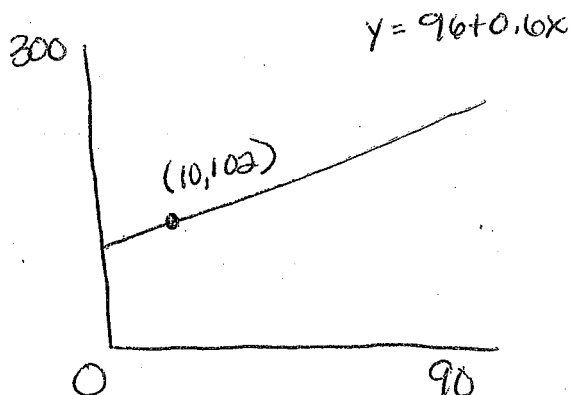
Parents often weigh their child at regular intervals during the first several months after birth. The data usually can be modeled well with a linear function. For example, the rule  $y = 96 + 0.6x$  gives Rachel's weight in ounces as a function of her age in days.

a. How much did Rachel weigh at birth?

96 ounces

b. Make a table and a graph of this function for  $0 \leq x \leq 90$  with  $\Delta x = 15$ .

x	$y = 96 + 0.6x$
0	96
15	127.5
30	159
45	190.5
60	222
75	253.5
90	285



c. For each equation or inequality below, use the table or graph to estimate the solution of the equation or inequality. Then explain what the solution tells you about Rachel's weight and age.

i.  $y = 96 + 0.6(10)$

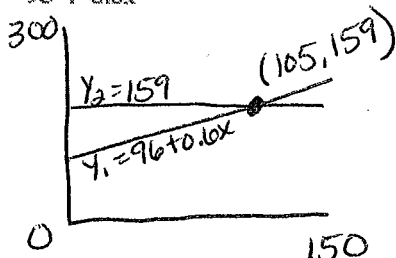
x	$y = 96 + 0.6x$
9	101.4
10	102
11	102.6

When Rachel is 10 days old, she will weigh 102 ounces.

For graph, see label above.

ii.  $159 = 96 + 0.6x$

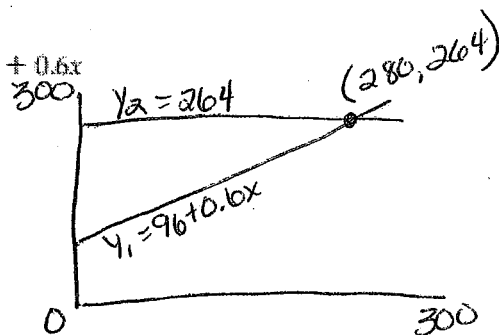
x	y
104	158.4
105	159
106	159.6



If Rachel weighs 159 ounces, then she is 105 days old.

iii.  $264 = 96 + 0.6x$

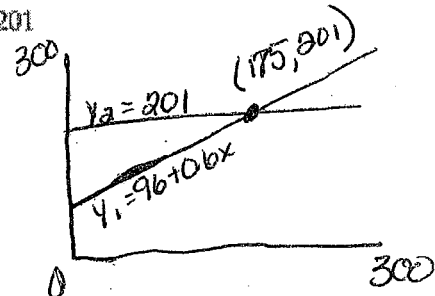
x	y
279	263.4
280	264
281	264.6



If Rachel weighs 264 ounces, then she is 280 days old.

iv.  $96 + 0.6x \leq 201$

x	y
174	200.4
175	201
176	201.6



Rachel will weigh 201 ounces or less if she is 175 days or younger.

2. The Yogurt Shop makes several different flavors of frozen yogurt. Each new batch is 650 ounces, and a typical cone uses 8 ounces. As sales take place, the amount  $A$  of each flavor remaining from a fresh batch is a function of the number  $n$  of cones of that flavor that have been sold. The function relating amount of yogurt left to number of cones sold is  $A = 650 - 8n$ .

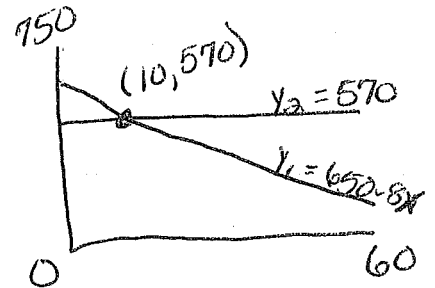
a. Solve each equation related to sales of chocolate-vanilla swirl yogurt. Show your work. Explain what your solution tells about sales of chocolate-vanilla yogurt and the amount left.

$$\begin{aligned} \text{i. } 570 &= 650 - 8n \\ -650 &-650 \\ \hline -80 &= -8n \\ -8 &-8 \\ \hline 10 &= n \end{aligned}$$

OR

x	y = 650 - 8x
9	578
10	570
11	562

OR



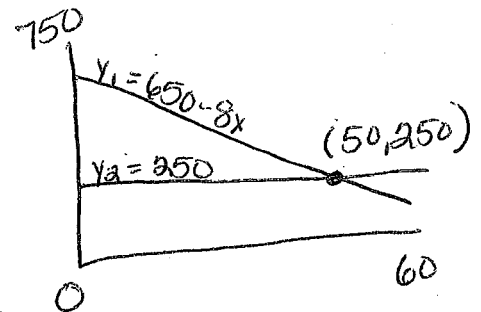
There will be 570 ounces of yogurt left after 10 cones are sold.

$$\begin{aligned} \text{ii. } 250 &= 650 - 8n \\ -650 &-650 \\ \hline -400 &= -8n \\ -8 &-8 \\ \hline 50 &= n \end{aligned}$$

OR

x	y = 650 - 8x
49	258
50	250
51	242

OR



There will be 250 ounces of yogurt left after 50 cones are sold.

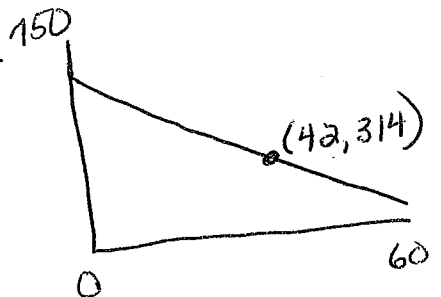
$$\text{iii. } A = 650 - 8(42)$$

$$A = 314 \text{ ounces}$$

OR

x	y = 650 - 8x
41	322
42	314
43	306

OR



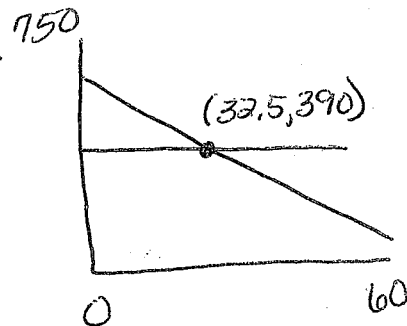
After 42 cones are sold, there will be 314 ounces left.

b. Use the function  $A = 650 - 8n$  to write and solve equations to answer the following questions.

i. How many cones have been sold if 390 ounces remain?

$$\begin{aligned} \text{Equation: } 390 &= 650 - 8n & \text{OR} \\ -650 &= -650 \\ \hline -260 &= -8n \\ \hline -8 & \quad -8 \\ 32.5 &= n \end{aligned}$$

X	Y = 650 - 8x
32	394
32.5	390
33	386

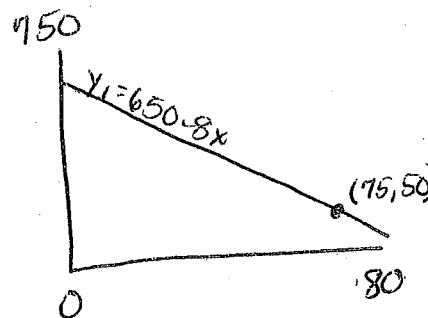


About 32 or 33 cones have been sold if 390 ounces remain.

ii. How much yogurt will be left when 75 cones have been sold?

$$\begin{aligned} \text{Equation: } A &= 650 - 8(75) & \text{OR} \\ A &= 50 \end{aligned}$$

X	Y = 650 - 8x
74	58
75	50
76	42

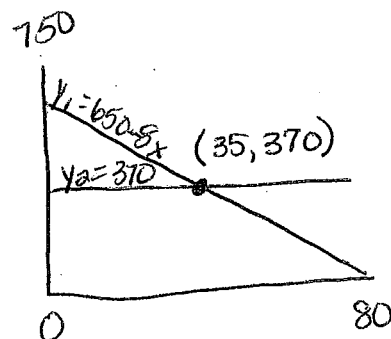


When 75 cones have been sold, there are 50 ounces of yogurt remaining.

iii. If the machine shows 370 ounces left, how many cones have been sold?

$$\begin{aligned} \text{Equation: } 370 &= 650 - 8n \\ -650 &= -650 \\ \hline -280 &= -8n \\ \hline -8 & \quad -8 \\ 35 &= n \end{aligned}$$

X	Y = 650 - 8x
34	378
35	370
36	362



35 cones have been sold if 370 ounces remain.

When people shop for cars or trucks, they usually look closely at data on fuel economy. The data are given as miles per gallon in city and in highway driving. Let  $c$  stand for miles per gallon in city driving and  $h$  stand for miles per gallon in highway driving. Data from tests of 20 of the most popular American cars and trucks show that the function  $h = 1.4 + 1.25c$  is a good model for the relation between the variables. Solve the following equations algebraically. Explain what the results tell you about the relation between city and highway mileage. Be prepared to explain the reasoning you used to find each solution.

$$\begin{array}{r} a. \quad 35 = 1.4 + 1.25c \\ -1.4 \quad -1.4 \end{array}$$

$$\text{Check: } 1.4 + 1.25(26.88) = 35 \\ 35 = 35$$

$$\frac{33.6}{1.25} = \frac{1.25c}{1.25}$$

$$26.88 = c$$

If a car or truck gets 35 mpg in highway driving, then it will get 27 mpg in city driving.

$$\begin{array}{r} b. \quad 10 = 1.4 + 1.25c \\ -1.4 \quad -1.4 \end{array}$$

$$\text{Check: } 1.4 + 1.25(6.88) = 10 \\ 10 = 10$$

$$\frac{8.6}{1.25} = \frac{1.25c}{1.25}$$

$$6.88 = c$$

If a car or truck gets 10 mpg in highway driving, then it will get 7 mpg in city driving.

$$c. \quad h = 1.4 + (1.25)(20)$$

$$h = 26.4$$

$$\text{Check: } 26.4 = 1.4 + 1.25(20) \\ 26.4 = 26.4$$

If a car or truck gets 20 mpg in city driving, then it will get 26 mpg in highway driving.