

Name _____

Date _____

1. Write and solve each of the following linear equations.

- a. Romeo has a certain amount of candy hearts. If he eats 15 of them, then he has $\frac{1}{4}$ of the original amount left. How many candy hearts did Romeo have initially?

let x = amount of candy hearts initially

$$\begin{array}{r|l} x - 15 & = \frac{1}{4} \cdot x \\ -x & -1x \\ \hline -15 & = -0.75x \\ \hline \cdot 75 & \cdot 75 \end{array}$$

$$\boxed{20 = x}$$

of \rightarrow must!

- b. Three consecutive integers have a sum of 126. What are the three integers?

$$\begin{aligned} \text{let } x &= \text{1st integer} = 41 \\ x+1 &= \text{2nd integer} = 41+1 = 42 \\ x+2 &= \text{3rd integer} = 41+2 = 43 \end{aligned}$$

$$\underline{x} + \underline{x} + \underline{1} + \underline{x} + \underline{2} = 126$$

$$\begin{array}{r} 3x + 3 = 126 \\ - 3 \qquad - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3x = 123 \\ \underline{3} \qquad \underline{3} \\ \hline \end{array}$$

$$\boxed{x = 41}$$

- c. Heather is reading a book that has 186 pages. She already read some of it last week. She plans to read 20 pages tomorrow. By then, she will be $\frac{2}{3}$ of the way through the book. How many pages did Heather read last week?

let x = number of pages Heather read last week.

$$x + 20 = \frac{2}{3} \cdot 186$$

$$\begin{array}{r} x + 20 = 124 \\ - 20 \quad - 20 \\ \hline \end{array}$$

$$x = 104$$

- a. Without solving, identify whether each of the following equations has a unique solution, no solution, or infinitely many solutions.

i. $2x + 3 = 5x - 4 - x$ *No solution!*
 $2x + 3 = 2x - 4$

ii. $6(x - 12) = 3(x - 4) + 1(3x - 60)$ *infinite!*
 $6x - 72 = 3x - 12 + 3x - 60$
 $6x - 72 = 6x - 72$

iii. $12x + 9 = 8x + 1 + 4x$
 $12x + 9 = 12x + 1$ *NO solution*

iv. $2(x - 3) = 10x - 6 - 8x$
 $2x - 6 = 2x - 6$ *Infinite*

v. $3x + 10 = 8x - 2$

A unique solution

- b. Solve the following equation for a number x . Verify that your solution is correct.

$$\begin{array}{r|l} 5x + 2 = -13 & \\ -2 & -2 \\ \hline 5x & -15 \\ \hline 5 & 5 \\ \hline x & = -3 \end{array}$$

check!

$$\begin{aligned} 5x + 2 &= -13 \\ 5(-3) + 2 &= -13 \\ -15 + 2 &= -13 \\ -13 &= -13 \checkmark \end{aligned}$$

- c. Solve the following equation for a number x . Verify that your solution is correct.

Check

$$5(6.5) - 2 + 3(6.5) = 4(6.5 + 6)$$

$$\boxed{32.5 - 2 + 19.5 = 4(12.5)}$$

$$50 = 50 \checkmark$$

$$5x - 2 + 3x = 4(x + 6)$$

$$\begin{array}{r|l} 8x - 2 & = 4x + 24 \\ -4x & -4x \end{array}$$

$$\begin{array}{r|l} 4x - 2 & = 24 \\ +2 & +2 \end{array}$$

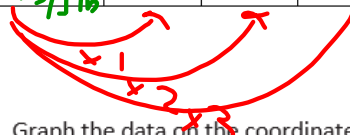
$$\begin{array}{r|l} 4x & = 26 \\ \hline 4 & 4 \end{array}$$

$$\boxed{x = \frac{13}{2} = 6.5}$$

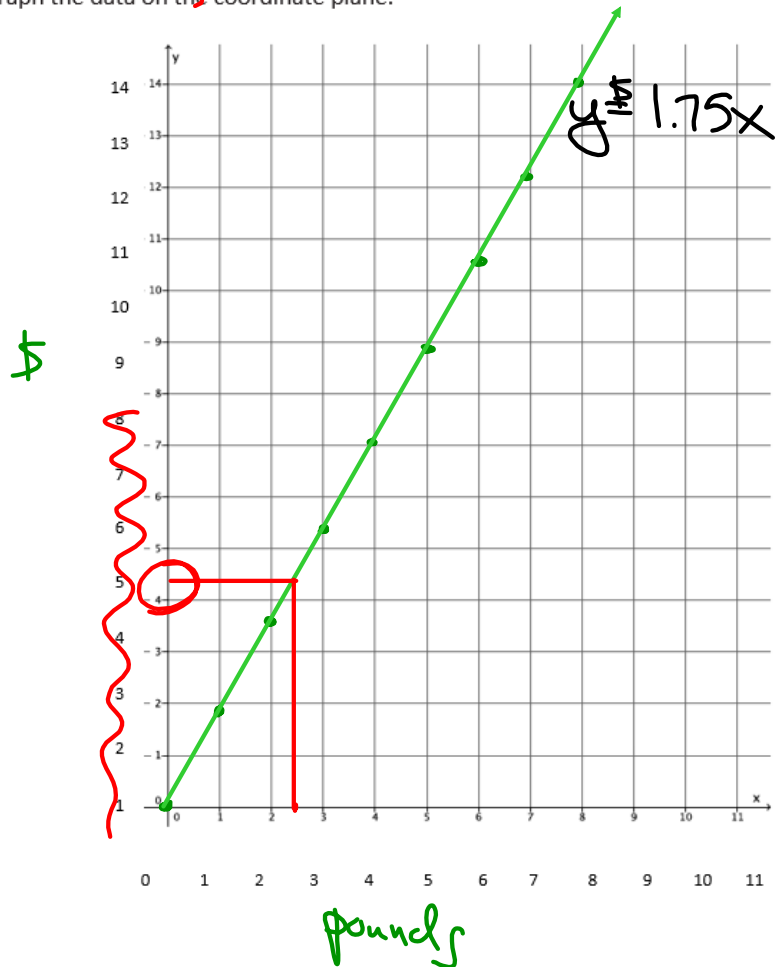
$$3. \quad \begin{array}{r} \$1.75 \\ 5 \overline{)8.75} \end{array} \quad \begin{array}{r} \$8.75 \\ 5 \text{ lbs} \end{array} = \begin{array}{r} \$1.75 \\ 1 \text{ lb} \end{array}$$

a. The Incredible Hulk paid \$8.75 for five pounds of protein powder. Assuming each pound of protein powder costs the same amount, complete the table of values representing the cost of protein powder in pounds.

Protein Powder in Pounds (x)	1	2	3	4	5	6	7	8
Cost in Dollars (y)	\$1.75	\$3.50	\$5.25	\$7.00	\$8.75	\$10.50	\$12.25	\$14.00



b. Graph the data on the coordinate plane.



c. On the same day, Incredible Hulk's friend, Spiderman, was charged \$6 for 2.5 lbs. of protein powder. Explain in terms of the graph why this must be a mistake.

2.5 lbs should cost between \$4 and \$5 according to the graph.

BONUS: What is the equation of the line that you drew in 3b?

