1.1 Connect English with Mathematics and Graphing Lines

A Connect English with Mathematics

Signal or key words determine the relationships among the given data (information):

Addition	Subtraction	Multiplication	Division
increased by more (less) than combined (al)together total of sum plus added to raise both extra in all additional	decreased by minus less difference between/of less than take away reduce change lost left remain dropped (more) fewer than	of times multiplied by product of as much by twice increased/decreased by a factor of	per a into divided by (evenly) cut (into) split (into) each every average out of ratio of quotient of percent

Ex 1. For each case, assign variables to the quantities involved and write a relation between them.

Let statements.

a) Tom is 5 years older than his sister Anne.

Let t be Tom's age
Let a be Anne's age

$t = a + 5$

b) After writing the final exam, Sami's score on MPM2D course dropped by 3%.

Let x be the score before and y be the score after

$y = x - \frac{3}{100} \cdot x$

c) Mr. G has 46 students in total enrolled in his MPM2D and MBF3C classes this quadmester.

Let x be the number of students in MPM2D and y be

$x + y = 46$

d) The temperature this morning is 10 degrees more than twice the temperature this time yesterday.

Let x be the temperature yesterday and y - - - - - - - today

$y = 10 + 2x$

e) 35% of the students at Glenforest SS are enrolled in extra curriculum activities.

$y = \frac{35}{100} x$ $\quad y = 0.35x$

Let x be the total number of students at GSS and y be the number of students at GSS enrolled in extra curriculum activities.

Ex 2. Make up a real life situation which may be describes by the following relations.

a) $x - y = 50$

"The difference between the prices of these two laptops is $ 50"

b) $a/(2b) = 100$

"The ratio between the length and twice the width of this pathway is 100"

c) $x(x + 1) = 72$

"The product of two consecutive integers is 72"

$Ax^1 + By^1 + C =$ Linear Relation $\Rightarrow$ x and y are raised to power 1

B Linear Systems

A *Linear System* is a set of two or more linear relations (equations) considered at the same time. For example:

$$\begin{cases} y = 2x \\ y = -x + 3 \end{cases}$$

C Solution of a Linear System

An ordered pair (a, b) is a *solution* of a linear system of two equations, with the unknown quantities x and y, if by the substitution $x = a$ and $y = b$, both equations are satisfied at the same time.

Ex 3. Show that $x = 4$ and $y = -2$ is a solution of the following linear system.

$$\begin{cases} 2y + x = 0 \\ y = -x + 2 \end{cases}$$

Ex 4. Design a system of two linear equation such that $x = -5$ and $y = 3$ is a solution.

D Solving a Linear System

Solving a linear system means find all solutions satisfying the system.
A linear system may be solved by the following methods:

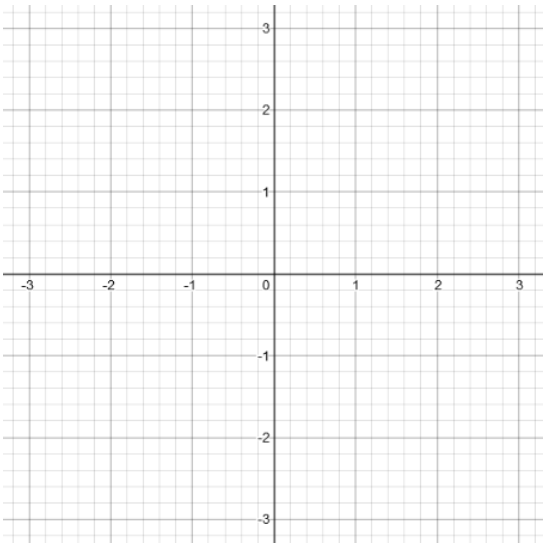
- ✓ Graphing
- ✓ Substitution
- ✓ Elimination

E Solving a Linear System by Graphing

- ✓ Graph each linear relation
- ✓ Find the point of intersection (a, b)
- ✓ Write the solution as $x = a$ and $y = b$

Ex 5. Solve the following system of equations by graphing.

$$\begin{cases} y = 2x \\ y = -x + 3 \end{cases}$$



F Technology

- ✓ Technology may be used to find the solution of a linear system of equations.

Ex 6. Use Desmos or GeoGebra to find (graphically) the solution to the following system of equations.

$$\begin{cases} y = 3x - 2 \\ x + 2y = 10 \end{cases}$$

Ex 7. Use Wolfram Alpha to find the exact solution of the following system of equations.

$$\begin{cases} x + \pi y = 5 \\ y = 4x - 3 \end{cases}$$

Ex 8. Write a system of linear equations corresponding to this real life application and then solve the system by graphing.

Julia spent $24 in total on purchasing $2 notebooks and $3 binders. Julia got 10 items in total. How many notebooks and how many binders have been purchased by Julia?

Ex 9. Find a real life application corresponding to the following linear system of equations. Find the solution by graphing.

$$\begin{cases} y = 2x - 5 \\ x + y = 25 \end{cases}$$

Reading: Textbook Pages 8-16
Homework: Textbook Pages 16-19 # 3, 7, 8a (by graphing), 9a (by graphing), 10a (by using technology)