GUIDED NOTES: Applications of Systems of Equations

Step 1: Define your variables
Step 2: Set up your systems of equations
Step 3: Solve the system
Step 4: Write your answer in context of the problem based on the variables you set up

EX1. Sue has a collection of quarters and nickels. She has 17 coins whose total value is $1.85. How many of each type of coin does she have?

x: quarters
y: nickels

$x + y = 17$
$0.25x + 0.05y = 1.85$

5 quarters & 12 nickels

$x + y = 17$
$-x \quad -x$
$y = -x + 17$

$0.25x + 0.05y = 1.85$
$-0.25x \quad -0.25x$
$\frac{0.05y}{0.05} = \frac{-0.25x + 1.85}{0.05} = y$

EX2. A certain movie theater has a capacity of 250 people. A child's ticket costs $3.00 and an adult movie ticket costs $4.50. A full house last night made $1017. How many children and adults attended the movie?

x: child
y: adults

$x + y = 250$
$3x + 4.5y = 1017$

72 children & 178 adults

$x + y = 250$
$-x \quad -x$
$y = -x + 250$

$3x + 4.5y = 1017$
$-3x \quad -3x$
$\frac{4.5y}{4.5} = \frac{-3x + 1017}{4.5} = y$

EX3. Jaden took 60 minutes to answer a combination of 20 multiple-choice and extended-response questions. He took 2 minutes to answer each multiple choice question and 6 minutes to answer each extended-response question. How many of each type of question was on the test?

x: multiple-choice
y: extended response

$x + y = 20$
$2x + 6y = 60$

15 MC & 5 ER

$x + y = 20$
$-x \quad -x$
$y = -x + 20$

$2x + 6y = 60$
$-2x \quad -2x$
$\frac{6y}{6} = \frac{-2x + 60}{6} = y$

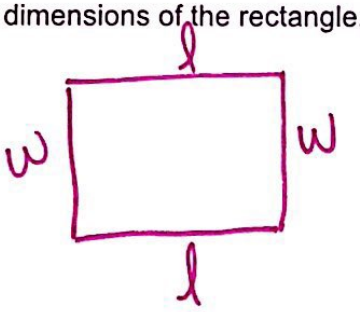
EX4. The Robertson Cell Phone Company charges $50 per month plus 15 cents per minute while the Stogner Cell Phone Company charges no monthly fee but 25 cents per minute. After how many minutes of phone usage would a monthly phone bill be the same from both companies?

x: minutes
y: cost

$y = 50 + 0.15x$ ← Robertson
$y = 0.25x$ ← Stogner

500 minutes

EX5. The perimeter of a rectangle is 64 feet. The length is thirteen feet less than twice the width. Find the dimensions of the rectangle.



$l = 2w - 13$

$2l + 2w = 64$

$l = y$
$w = x$

$y = 2x - 13$

$2y + 2x = 64$
$-2x \quad -2x$

$\frac{2y}{2} = \frac{-2x + 64}{2} = y$

$l = 17$ ft
$w = 15$ ft