

MONTGOMERY COLLEGE
Department of Mathematics
Rockville Campus

MA 103 KATIRAIIE QUIZ #4 Form A SECTIONS (4.1, 4.2, and 5.1) FALL 2007

NAME Solution

SCORE: / 20

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1. Solve the following system of equations using Substitution or Elimination method.

$$\begin{cases} 3x + 2y = -1 \\ 4x - y = -5 \end{cases} \quad \begin{cases} 3x + 2y = -1 \\ 8x - 2y = -10 \end{cases}$$

$$11x = -11 \Rightarrow x = -1$$

$$4(-1) - y = -5$$

$$-4 - y = -5$$

$$\begin{array}{r} -4 - y = -5 \\ +4 \quad +4 \\ \hline -y = -1 \end{array} \Rightarrow y = 1$$

$(-1, 1)$

2. A vending machine will only accept quarters and dimes. When the coins are collected, the machine has 226 coins worth \$24.10. How many quarters were there? How many dimes?
Show your work!

let $x =$ No of quarters
 $y =$ No of Dimes

$$\begin{array}{r} 2410 \\ -2260 \\ \hline 150 \end{array}$$

$$\begin{cases} x + y = 226 \\ 25x + 10y = 2410 \end{cases}$$

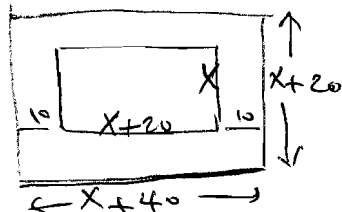
$$\begin{cases} -10x - 10y = -2260 \\ 25x + 10y = 2410 \end{cases}$$

$$15x = 150$$

$$x = \frac{150}{15} = 10$$

there were 10 quarters and 216 Dimes

3. A 10-foot wide sidewalk around a rectangular swimming pool has a total area of 2400 square feet. Find the dimensions of the swimming pool if the pool is 20 feet longer than it is wide



$$(x+40)(x+20) - x(x+20) = 2400$$

$$x^2 + 60x + 800 - x^2 - 20x = 2400$$

$$40x + 800 = 2400$$

$$40x = 1600$$

$$x = 40 \text{ feet}$$

the pool is 40 feet by 60 feet

let x = speed of the Boat
 y = speed of current

4. A boat travels upstream 120 miles in 6 hours. The return trip takes 4 hours. Find the speed of the boat without a current and the speed of the current.

$$\begin{cases} 120 = (x-y)6 \\ 120 = (x+y)4 \end{cases}$$

\Rightarrow

$$20 = x - y$$

$$30 = x + y$$

$$50 = 2x \Rightarrow$$

$$x = 25 \text{ mph}$$

$$x + y = 30$$

$$y = 30 - x$$

$$= 30 - 25 = 5 \text{ mph}$$

Speed of Boat = 25 mph

Speed of Current = 5 mph

5. A student takes out two loans to help pay for college. One loan is at 9% simple interest, and the other is at 7% simple interest. The total amount borrowed is \$6000, and the interest after 1 year for both loans is \$470. Find the amount of each loan.

$$\begin{cases} x + y = 6000 \\ 0.09x + 0.07x = 470 \end{cases}$$

\Rightarrow

$$\begin{cases} x + y = 6000 \\ 9x + 7y = 47000 \end{cases}$$

$$9x + 7y = 47000$$

$$-9x - 9y = -54000$$

$$9x + 7y = 47000$$

$$-2y = -7000$$

$$y = \$3500$$

$$x + y = 6000$$

$$x + 3500 = 6000$$

$$x = \$2500$$