MONTGOMERY COLLEGE
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MA 103 KATIRAIE QUIZ #4 Form A SECTIONS (4.1, 4.2, 5.1) Spring 2007

NAME _____ SCORE: ____/ 20

*** RETAIN ALL GRADED PAPERS FOR YOUR RECORDS ***

1. A student takes out two loans to help pay for college. One loan is at 7.5% simple interest, and the other is at 9.5% simple interest. The total amount borrowed is $3500, and the interest after 1 year for both loans is $302.50. Find the amount of each loan.

(Hint: 7.5% = 0.075 and 9.5% = 0.095 Now Set up a system of equations, and Multiply one of the equations by 1000 to get rid of decimals.)

$$\begin{cases} x+y=3500 \\ 0.075x+0.095y=302.50 \end{cases} \xrightarrow{-75} \begin{cases} x+y=3500 \\ 75x+95y=302500 \end{cases} \Rightarrow \begin{cases} -75x-75y=-262500 \\ 75x+95y=302500 \end{cases}$$

$$20y=40000$$

$$y=2000$$

and $x=1500$

Answer:
$1500 was borrowed at 7.5% interest
$2000 was borrowed at 9.5% interest

2. A boat travels downstream 150 miles in 5 hours. The return trip takes 7 hours and 30 minutes. Find the speed of the boat without a current and the speed of the current

let speed of boat = x speed of current = y

Distance = speed * time

$$150=(x+y)(5) \qquad 150=(x-y)\cdot(7.5)$$

$$\Rightarrow \begin{cases} 30=x+y \\ 20=x-y \end{cases}$$

$$50=2x$$

$25 \text{ mph} = x$ and $y=5$ mph

No speed of boat is 25mph and speed of current is 5mph

3a) **Write a polynomial that gives the sum of the areas of a square with sides of length x and a circle with radius x.**

$A = x^2 + \pi x^2$

b) **Find the combined area when x = 10 inches.**

$A = 10^2 + \pi(10)^2 = 100 + 100\pi \text{ inch}^2$

$= 414.16 \approx 414 \text{ inch}^2$

4. A number minus twice a second number equals 7. The Sum of the two numbers is 16. Find the two numbers.

$\begin{cases} x - 2y = 7 \\ x + y = 16 \end{cases} \Rightarrow$ $\times 2$

$x - 2y = 7$

$2x + 2y = 32$

$3x = 39$

$x = 13$ and $y = 3$

$(13, 3)$

5. The sum of two numbers is 25, and their difference is 11. Find the two numbers.

$\begin{cases} x + y = 25 \\ x - y = 11 \end{cases}$

$2x = 36$

$x = 18$

$y = 7$

Final Answer

$(18, 7)$

solution

$y = -2x - 1$

$2x - (-2x - 1) = -3$

$2x + 2x + 1 = -3$

$4x = -4$

$\boxed{x = -1}$

$y = -2(-1) - 1 = +2 - 1 = 1$

$\boxed{(-1, 1)}$

$\begin{cases} 2x - y = 5 \\ x + y = 16 \end{cases}$

$3x = 21$

$\boxed{x = 7}$

$2(7) - y = 5$

$14 - y = 5$

$-14 \quad -14$

$-y = -9$

$\boxed{y = 9}$

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2)

$-2\begin{cases} 2x + y = 2 \\ 4x + 2y = 4 \end{cases}$

$-4x - 2y = -4$

$4x + 2y = 4$

$0 = 0$

Many Solutions

#4

$\begin{cases} x + y = 3500 \\ 0.08x + 0.09y = 294 \end{cases}$

$y = -x + 3500$

$0.08x + 0.09(-x + 3500) = 294$

$0.08x - 0.09x + 315 = 294$

$-0.01x = -21$ $\quad \boxed{x = 2100}$

$y = 3500 - 2100 = \$1400$

(Form B) Quiz 4B Fall 2006 Solution

#1

$y = -3x + -1$

$4x - (-3x - 1) = -6$

$4x + 3x + 1 = -6$

$-1 \quad -1$

$7x = -7$

$x = -1$

$y = -3(-1) + -1 = 3 - 1 = 2$

$(-1, 2)$

#2

$\begin{cases} 2x - 4y = 5 \\ 2(-x + 2y = 9) \end{cases}$

$\begin{cases} 2x - 4y = 5 \\ -2x + 4y = 18 \end{cases}$

$0 = 23$

NO Solution

#3

$\begin{cases} x + y = 18 \\ x - y = 6 \end{cases}$

$2x = 24$

$x = 12$

$12 + y = 18$

$y = 6$

#4 let x = speed of Boat
y = speed of current

$\begin{cases} 5(x + y) = 150 \\ 7.5(x - y) = 150 \end{cases}$

$\begin{cases} 5x + 5y = 150 \\ 7.5x - 7.5y = 150 \end{cases}$ $\begin{cases} x + y = 30 \\ 7.5x - 7.5y = 150 \end{cases}$ $)7.5$

$\begin{cases} 7.5x + 7.5y = 225 \\ 7.5x - 7.5y = 150 \end{cases}$

$15x = 375$

$x = 25$ mph

$x + y = 30$

$25 + y = 30 \Rightarrow y = 5$ mph