

MTH 65 – Winter Term 2011  
Test 1 – Given January 19

Name Key

You may use your calculator on this portion of the test.

**Directions for Problem Set 4 of the test**

Find the solution to each word problem. To earn full credit for each problem you must:

- Clearly define two variables (for problem 1 only ... the variables are given in problem 2)
- Use your two variables to come up with two equations that model the problem.
- Solve the resultant system of equations using the method of your choice.
- State a contextual conclusion using a complete sentence.

1. A community center sells a total of 301 tickets for a basketball game. An adult ticket costs \$3 and a student ticket costs \$1. The sponsors collect \$487 in ticket sales. Find the number of each type of ticket sold.

Let  $x$  represent the number of adult tickets sold and  $y$  the number of student tickets sold.

$$\begin{cases} x + y = 301 \\ 3x + y = 487 \end{cases} \Rightarrow \begin{cases} -1(x + y) = -1(301) \\ 3x + y = 487 \end{cases}$$

$$\Rightarrow \begin{cases} -x - y = -301 \\ 3x + y = 487 \end{cases}$$

$$\underline{2x = 186}$$

$$\frac{2x}{2} = \frac{186}{2}$$

$$x = 93$$

$$y = 301 - 93 = 208$$

93 adult tickets  
were sold and 208  
student tickets were  
sold

Check...

$$3(93) + 208 = 279 + 208 = 487 \checkmark$$

2. The perimeter of the rectangle in Figure 1 is 34 inches and the perimeter of the triangle in Figure 2 is 30 inches; the value of  $x$  is the same in both figures as is the value of  $y$ . Find the values of  $x$  and  $y$ .

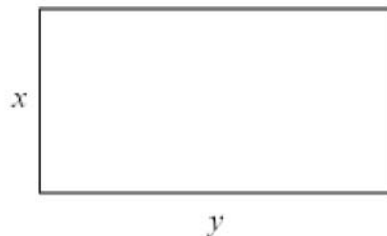


Figure 1: A Rectangle

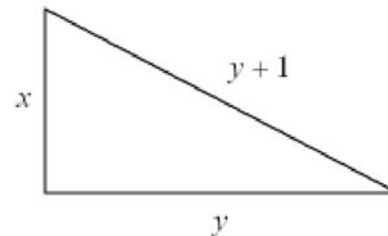


Figure 2: A Right Triangle

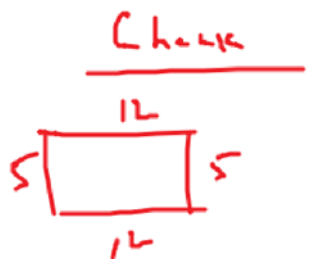
$$\begin{cases} 2x + 2y = 34 \\ x + y + (y+1) = 30 \end{cases} \Rightarrow \begin{cases} 2x + 2y = 34 \\ x + 2y = 29 \end{cases}$$

$$\Rightarrow \begin{cases} 2x + 2y = 34 \\ -1(x + 2y) = -1(29) \end{cases}$$

$$\Rightarrow \begin{cases} 2x + 2y = 34 \\ -x - 2y = -29 \end{cases}$$


---


$$x = 5$$



$$10 + 24 = 34 \checkmark$$



$$5 + 12 + 13 = 30 \checkmark$$

Backsub into  $x + 2y = 29$

$$5 + 2y = 29$$

$$2y = 24$$

$$y = 12$$

Conclusion:  $x = 5$  and  $y = 12$ , Bucko.