

## Assignment 1

Math 1030

Due Friday, August 31st

### 1. Fractions, Decimals, and Percentages

Express "three-fourths" as a fraction, a decimal, and a percentage.

$$\frac{3}{4}, .75, 75\%$$

### 2. Working with Fractions

Evaluate the following:

$$(a) \frac{2}{5} \left( \frac{1}{3} + \frac{3}{7} \right) = \frac{2}{5} \left( \frac{7}{21} + \frac{9}{21} \right) = \frac{2}{5} \left( \frac{16}{21} \right) = \boxed{\frac{32}{105}}$$

$$(b) \frac{3}{\frac{2}{9}} + \frac{1}{2} = \frac{9 \cdot 3}{9 \cdot (\frac{2}{9})} + \frac{1}{2} = \frac{27}{2} + \frac{1}{2} = \frac{28}{2} = \boxed{14}$$

### 3. Exponents

Simplify the following:

$$(a) (x^0)^7 (y^2)^3 = 1^7 y^{2 \cdot 3} = \boxed{y^6}$$

$$(b) (xy^2)^3 (x^2y^3) = (x^3y^6)(x^2y^3) = \boxed{x^5y^9}$$

#### 4. Simultaneous Equations

The sum of two numbers is 44, while the product of the same two numbers is 483. What are the two numbers?

$$x + y = 44$$

$$xy = 483$$

$$\Rightarrow x(44 - x) = 483$$

$$\Rightarrow 44x - x^2 = 483$$

$$\Rightarrow x^2 - 44x + 483$$

$$= (x - 21)(x - 23)$$

So, the numbers are:  $x = \boxed{21 \text{ and } 23}$

#### 5. Quadratic Equation

Solve for  $x$  in the following equations:

Note - You may get more than one possible value for  $x$ .

(a)  $x^2 + x - 4$

Sorry. Should have been  $x^2 + x - 4 = 0$

$$\Rightarrow x = \frac{-1 \pm \sqrt{1^2 - 4(1)(-4)}}{2} = \boxed{\frac{-1 \pm \sqrt{17}}{2}}$$

(b)  $x(x + 2) = 7$

$$\Rightarrow x^2 + 2x = 7 \Rightarrow x^2 + 2x - 7 = 0$$

$$\Rightarrow x = \frac{-2 \pm \sqrt{4 - 4(1)(-7)}}{2} = \frac{-2 \pm \sqrt{32}}{2}$$

$$= -1 \pm \sqrt{8} = \boxed{-1 \pm 2\sqrt{2}}$$

6. Ratios

You're asked to make one gallon of mouthwash from a concentrated mouthwash solution. The instructions says to dilute the solution with water in a 3 : 1 ratio. How many quarts of the concentrated solution will you need to make one gallon of mouthwash?

1 quart solution

1 quart solution + 3 quarts ~~mouth~~ water  
= 1 gallon mouthwash

7. Compounding

Suppose you take out a student loan of \$2500 at the start of your freshman year. During the four years you're in school you don't have to make any payments, but the loan generates interest at a rate of 3% each year. When you start making payments at the end of four years, how much will you need to pay off?

$$(\$2,500)(1.03)^4 = \$2,813.77$$

8. Graphing Linear Equations

Sketch a graph of the line  $3x + 4y = 7$ , and give the slope and  $y$ -intercept of this line.

$$3x + 4y = 7$$

$$\Rightarrow 4y = -3x + 7$$

$$\Rightarrow y = -\frac{3}{4}x + \frac{7}{4}$$

slope =  $-\frac{3}{4}$   
 $y$ -intercept =  $\frac{7}{4}$

