

## MTH 60, Fall Term 2009 Practice Test 2

## Section 1 – State the “answer”

In this section, the “answer” is all I am looking for. Write each final “answer” in the provided blank. Please do any and all scratch work in the provided scratch work areas. Please make sure that you double check your answers before turning in your test.

1. Write the requested bit of information in each provided blank.

- |    |  |    |  |
|----|--|----|--|
| a. | What is 40% of 80 clowns?  | a. | <u>32 clowns</u>   |
| b. | 105 is what percent of 375?  | b. | <u>28%</u>   |
| c. | 43,732 jelly beans is 29% of what?                                     | c. | <u>150,800 jelly beans</u>   |
| d. | What is the value of $-x^2$ when $x = -6$ ?                            | d. | <u>-36</u>   |
| e. | What is the new price of a \$24 shirt if that price is reduced by 20%? | e. | <u>\$19.20</u>   |
| f. | What special name do we give equations like $2 = 7$ ?                  | f. | <u>Contradiction</u>   |
| g. | What are two symbols for the empty set?                                | g. | <u><math>\emptyset</math> and <math>\{\}</math></u>                      |
| h. | What is a symbol for the real numbers?                                 | h. | <u><math>\mathbb{R}</math></u>   |
| i. | Write .02% as a fraction.  | i. | <u><math>\frac{.02}{100} = \frac{2}{10,000} = \frac{1}{5,000}</math></u> |
| j. | Simplify $-3^2 \div 2 \times 4$  | j. | <u>-18</u>   |

*I'd accept any one of these* →

## Section 2 – Show your work

In this section, the “answer” is obviously still very important, but I will also be evaluating your ability to show the steps and organize your work as discussed, illustrated, and practiced in class.. Please do any and all scratch work in the provided scratch zones. Please make sure that you double check your answers before turning in your test. Please make sure that you've done things like lining up equal signs, stating variable values (where appropriate), etc.

2. Solve each equation for the indicated variable. Show the steps that help *you* successfully complete the problem making sure to use the format illustrated and discussed in class

- a. Solve the formula  $y = mx + b$  for the variable  $x$ .

$$\begin{aligned} y &= mx + b \\ y - b &= mx + b - b \\ y - b &= mx \\ \frac{y - b}{m} &= \frac{mx}{m} \end{aligned}$$

$$\begin{aligned} \frac{y - b}{m} &= x \\ \text{So...} \\ x &= \frac{y - b}{m} \end{aligned}$$

- b. Solve the formula  $S = 2\pi r^2 + 2\pi rh$  for the variable  $h$

$$\begin{aligned} S &= 2\pi r^2 + 2\pi rh \\ S - 2\pi r^2 &= 2\pi r^2 + 2\pi rh - 2\pi r^2 \\ S - 2\pi r^2 &= 2\pi rh \\ \frac{S - 2\pi r^2}{2\pi r} &= \frac{2\pi rh}{2\pi r} \end{aligned}$$

$$\begin{aligned} \text{So...} \\ h &= \frac{S - 2\pi r^2}{2\pi r} \end{aligned}$$

- c. Solve the formula  $y - y_1 = m(x - x_1)$  for the variable  $x$ .

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - y_1 &= mx - mx_1 \\ y - y_1 + mx_1 &= mx - mx_1 + mx_1 \\ y - y_1 + mx_1 &= mx \\ \frac{y - y_1 + mx_1}{m} &= \frac{mx}{m} \end{aligned}$$

$$\begin{aligned} \text{So...} \\ x &= \frac{y - y_1 + mx_1}{m} \end{aligned}$$

3. The number of single parents in Clatsop county who subscribe to the Disney Channel on their cable television system has decreased by 40% since the release of High School Musical 3. A total of 1107 single parents in Clatsop county now subscribe to the Disney channel; how many subscribed to the channel before the release of High School Musical 3?

Let  $x$  be the number of pre-HSM3 subscribers.

$$\text{new \#} = \text{old \#} - 40\%(\text{old number})$$

$$1107 = x - .40x$$

$$1107 = .6x$$

$$\frac{1107}{.6} = x$$

1845 =  $x$   
There were 1845 single parent subscribers before the release of High School Musical 3.

4. Use the formula  $A = \frac{1}{2}(b_1 + b_2)h$  to find the area of a trapezoid whose base lengths are 10 cm and 8 cm and whose height is 14 cm. Include the units in all calculations.

$$b_1 = 10 \text{ cm}, b_2 = 8 \text{ cm}, h = 14 \text{ cm}$$

$$A = \frac{1}{2}(10 \text{ cm} + 8 \text{ cm})(14 \text{ cm})$$

$$= \frac{1}{2}(18 \text{ cm})(14 \text{ cm})$$

$$= (9 \text{ cm})(14 \text{ cm})$$

$$= 126 \text{ cm}^2$$

The area is 126 cm<sup>2</sup>.

5. Find, to the nearest 10<sup>th</sup> of an inch, the radius of a circle whose circumference is 36 inches. Include the units in all calculations.

$$C = 36 \text{ in}$$

$$C = 2\pi r$$

$$36 \text{ in} = 2\pi r$$

$$\frac{36 \text{ in}}{2\pi} = r$$

$$5.7 \text{ in} \approx r$$

The radius is about 5.7 in.

**Section 4 – Equation Solving**

Solve each equation showing the steps you feel are necessary for you to correctly determine the solution. I will not deduct points for not showing steps, *so long as you come up with the correct solution*. You do need to notate your steps in the manner shown and discussed in class and you do need to make sure that your conclusion is clear.

6. Solve  $\frac{5}{4}(3-2y) = \frac{3}{8}(y-13)$ .

$$\begin{aligned}\frac{5}{4}(3-2y) &= \frac{3}{8}(y-13) \\ 8 \cdot \frac{5}{4}(3-2y) &= 8 \cdot \frac{3}{8}(y-13) \\ 10(3-2y) &= 3(y-13) \\ 30-20y &= 3y-39 \\ 30-20y+20y &= 3y-39+20y \\ 30 &= 23y-39 \\ 30+39 &= 23y-39+39\end{aligned}$$

7. Solve  $5-(t-7)-4t = -2t+3(1-t)$ .

$$\begin{aligned}5-(t-7)-4t &= -2t+3(1-t) \\ 5-t+7-4t &= -2t+3-3t \\ -5t+12 &= -5t+3\end{aligned}$$

$$\begin{aligned}-5t+12+5t &= -5t+3+5t \\ 12=3 &\leftarrow \text{contradiction!}\end{aligned}$$

$\therefore$  the equation has no solutions.

$$69 = 23y$$

$$\frac{69}{23} = \frac{23y}{23}$$

$$3 = y$$

$\therefore$  the solution is 3.

check

$$\begin{aligned}\frac{5}{4}(3-2(3)) &\stackrel{?}{=} \frac{3}{8}(3-13) \\ \frac{5}{4}(-3) &\stackrel{?}{=} \frac{3}{8}(-10) \\ -\frac{15}{4} &\stackrel{\checkmark}{=} -\frac{30}{8}\end{aligned}$$

8. Solve  $14 + 3x = 5 - 3(-2x - 3)$ .

$$14 + 3x = 5 - 3(-2x - 3)$$

$$14 + 3x = 5 + 6x + 9$$

$$14 + 3x = 14 + 6x$$

$$14 + 3x - 3x = 14 + 6x - 3x$$

$$14 = 14 + 3x$$

$$14 - 14 = 14 + 3x - 14$$

$$0 = 3x$$

$$\frac{0}{3} = \frac{3x}{3}$$

$$0 = x$$

The solution is 0.

Check

$$14 + 3(0) \stackrel{?}{=} 5 - 3(0 - 3)$$

$$14 + 0 = 5 - 3(-3)$$

$$14 \stackrel{?}{=} 5 + 9$$

9. Solve  $\frac{3}{2}x - \frac{x+6}{2} = x - 3$ .

$$\frac{3}{2}x - \frac{x+6}{2} = x - 3$$

$$2\left(\frac{3}{2}x - \frac{x+6}{2}\right) = 2(x - 3)$$

$$2 \cdot \frac{3}{2}x - 2 \cdot \frac{x+6}{2} = 2x - 6$$

$$3x - (x+6) = 2x - 6$$

$$3x - x - 6 = 2x - 6$$

$$2x - 6 = 2x - 6 \leftarrow \text{identity!}$$

Every real number is a solution to the equation!

Check 0

$$\frac{3}{2}(0) - \frac{0+6}{2} \stackrel{?}{=} 0 - 3$$

$$0 - \frac{6}{2} \stackrel{?}{=} -3$$

check 2

$$\frac{3}{2}(2) - \frac{2+6}{2} \stackrel{?}{=} 2 - 3$$

$$3 - \frac{8}{2} \stackrel{?}{=} -1$$

$$3 - 4 \stackrel{?}{=} -1$$

### Section 5 – Freeform answer

Determine the answer to each question as best as you can **showing all of the work that is relevant to determining your answer**. I will not deduct points for the way your work is organized so long as it is organized in a reasonable manner. To earn full credit, you do need to make sure that your conclusion is clear.

10. 120% of a certain number is the same as 2 more than 80% of that same number. What is the unknown number?

Let  $x$  be the unknown number

$$(120\%)x = (80\%)x + 2$$

$$1.2x = .8x + 2$$

$$.4x = 2$$

$$x = \frac{2}{.4}$$

$$x = 5$$

The number is 5.

11. Herbie was asked to determine the original price of a shirt whose price was \$20 after a 25% discount. Herbie decided to dispense with all of the  $x$  nonsense and just add 25% of \$20 to \$20 to determine the original price. What is the flaw in Herbie's plan? That is, *why* does this approach give Herbie the wrong answer? Help Herbie out and figure out the correct original price.

The problem is that 25% of the new price (\$20) is not the same as 25% of the original price

The discount was based upon the original price, not the new price.

$$\$20 = x - .25x$$

$$\$20 = .75x$$

$$\frac{\$20}{.75} = x$$

$$\$26.66 \approx x$$

The original price was \$26.67.