

MTH 60, Fall Term 2010
Test 2 – Given November 3, 2010

Name Key

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 on the provided scratch paper. 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. (2 points each)

a. What is the solution set to the equation $x + 1 = x + 5$?

a.

$\{ \}$

b. What is the solution set to the equation $3x + 1 = 5x + 1$?

b.

$\{ 0 \}$

c. What is the solution set to the equation $6x - 1 = 6x + 8$?

c.

$\{ \}$

d. What is 3% of 200?

d.

6

e. 3 is 60% of what number?

e.

5

f. 24% of what number is 40.8?

f.

170

g. What is a name we give equations like $7 = 12$?

g.

Contradiction

h. What is a name we give equations like $7 = 7$?

h.

identity

i. Write $\frac{3}{500}$ as a percent.

i.

.6%

j. Write 4.78 as a percent.

j.

478%

Section 2 – 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. Please make sure that you double check your answers before turning in your test.

2. Solve $2(4z + 3) - 8 = 46$. (6 points)

$$2(4z + 3) - 8 = 46$$

$$8z + 6 - 8 = 46$$

$$8z - 2 = 46$$

$$8z - 2 + 2 = 46 + 2$$

$$8z = 48$$

$$\frac{8z}{8} = \frac{48}{8}$$

$$z = 6$$

The solution is 6.

3. Solve $6x - (3x + 10) = 14$. (6 points)

$$6x - (3x + 10) = 14$$

$$6x - 3x - 10 = 14$$

$$3x - 10 = 14$$

$$3x - 10 + 10 = 14 + 10$$

$$3x = 24$$

$$\frac{3x}{3} = \frac{24}{3}$$

$$x = 8$$

The solution is 8.

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

$$\begin{aligned}\frac{y}{3} + \frac{2}{5} &= \frac{y}{5} - \frac{2}{5} \\ 15\left(\frac{y}{3} + \frac{2}{5}\right) &= 15\left(\frac{y}{5} - \frac{2}{5}\right) \\ 5y + 6 &= 3y - 6 \\ 5y + 6 - 3y &= 3y - 6 - 3y \\ 2y + 6 &= -6 \\ 2y + 6 - 6 &= -6 - 6 \\ 2y &= -12\end{aligned}$$

$$\frac{2y}{2} = \frac{-12}{2}$$

$$y = -6$$

The solution is -6.

5. Solve $4x + 9 - 5x = 5 - (x - 4)$. (6 points)

$$4x + 9 - 5x = 5 - (x - 4)$$

$$-x + 9 = 5 - x + 4$$

$$-x + 9 = -x + 9$$

$$-x + 9 + x = -x + 9 + x$$

$$9 = 9 \quad \text{Dang right it does!}$$

The solution set is \mathbb{R} .

Section 3 – 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 on the provided scratch paper. Please make sure that you do things like define your variables (where appropriate), state conclusions (where appropriate), etc. Please make sure that you double check your answers before turning in your test.

6. 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.
(6 points each)

- a. Solve the formula $A = \frac{1}{2}(a + b)$ for the variable b .

$$A = \frac{1}{2}(a + b)$$

$$2(A) = 2\left(\frac{1}{2}(a + b)\right)$$

$$2A = a + b$$

$$2A - a = a + b - a$$

$$\underline{\underline{2A - a = b}}$$

- b. Solve the formula $\frac{c}{2} + 80 = 2F$ for the variable c

$$\frac{c}{2} + 80 = 2F$$

$$2\left(\frac{c}{2} + 80\right) = 2(2F)$$

$$c + 160 = 4F$$

$$c + 160 - 160 = 4F - 160$$

$$\underline{\underline{c = 4F - 160}}$$

- c. Solve the formula $Ax + By = C$ for the variable x .

$$\begin{aligned}
 Ax + By &= C \\
 Ax + By - By &= C - By \\
 Ax &= C - By \\
 \frac{Ax}{A} &= \frac{C - By}{A}
 \end{aligned}$$

$$x = \frac{C - By}{A}$$

7. Lupé's salary this year is \$50,220 which is 8% more than her salary last year. What was Lupé's salary last year? (8 points)

Let x be Lupé's salary (\$) last year

$$x + .08x = 50,220$$

$$1.08x = 50,220$$

$$\frac{1.08x}{1.08} = \frac{50,220}{1.08}$$

$$x = 46,500$$

Lupé's salary was \$46,500 last year.

8. Use the formula $A = \frac{1}{2}(b_1 + b_2)h$ to find the height of a trapezoid whose base lengths are 10 cm and 8 cm and whose area is 846 cm^2 . Include the units in all calculations. (10 points)

$$b_1 = 10 \text{ cm}, \quad b_2 = 8 \text{ cm}, \quad A = 846 \text{ cm}^2$$

$$A = \frac{1}{2}(b_1 + b_2)h$$

$$2(A) = 2\left(\frac{1}{2}(b_1 + b_2)h\right)$$

$$2A = (b_1 + b_2)h$$

$$\frac{2A}{b_1 + b_2} = \frac{(b_1 + b_2)h}{b_1 + b_2}$$

$$\begin{aligned}
 h &= \frac{2A}{b_1 + b_2} \\
 &= \frac{2(846 \text{ cm}^2)}{10 \text{ cm} + 8 \text{ cm}} \\
 &= \frac{1692 \text{ cm}^2}{18 \text{ cm}}
 \end{aligned}$$

$$= 94 \text{ cm}$$

The height of the trapezoid is 94 cm.

9. Use the formula $A = \pi r^2$ to find, to the nearest 10^{th} , the area of a circle whose radius is 5 inches. Include the units in all calculations. (6 points)

$$\begin{aligned} r &= 5 \text{ inches} \\ A &= \pi (5 \text{ inches})^2 \\ &= 25\pi \text{ inches}^2 \\ &\approx 78.5 \text{ inches}^2 \end{aligned}$$

The area of the circle is about 78.5 in².

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. Two less than what number is equal to half the sum of the number and 8? (8 points)

$$\begin{aligned} \text{Let } x \text{ be the unknown number} \\ x - 2 &= \frac{1}{2}(x + 8) \\ 2(x - 2) &= 2\left(\frac{1}{2}(x + 8)\right) \\ 2x - 4 &= x + 8 \\ 2x - 4 - x &= x + 8 - x \end{aligned}$$

$$\begin{aligned} x - 4 &= 8 \\ x - 4 + 4 &= 8 + 4 \\ x &= 12 \end{aligned}$$

The unknown number is 12.

11. The price of a certain item is increased by 80% and that price is subsequently decreased by 80%. The final price is what percent of the original price? In other words, what percentage change would you make to the original price that would result in the final price? (6 points)

Suppose the original price is \$100.

After the price increase the price is \$180.

After the price decrease the price is

$$\$180 - .8(\$180) = \$36.$$

So the final price is a whopping 64% reduction from the original price!