Midterm Review Checklist
Answer Key

Are you comfortable with each type of problem listed below? If yes, complete the example and check off the box. If not, review your notes for that section, try the example and check your answer to make sure you are correct.   Any topics that you are still unsure about, you should be sure to follow up in class.

Chapter 1: Expressions, Equations and Functions

□ I can evaluate a basic algebraic expression (1.1)

Ex: $4 + 2w$ when $w = -3$

   *Be sure to substitute first (use parenthesis) and follow PEMDAS

$4 + 2(-3)$
$4 + -6$
-2

□ I can solve an order of operations problem (1.2)

Ex: $4 - 2 + 3 \div 3 \cdot 4$

   *Mult./Div. in order Left to Right. Add/Sub. in order left to right

$4 - 2 + 1 \cdot 4$
$4 - 2 + 4$
$2 + 4$
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□ I can translate verbal phrases into algebraic expressions, equations or inequalities (1.3/1.4)

Ex: 3 <u>less than</u> <u>three times</u> the <u>sum</u> of x and 7

   *Underline key words/phrases one at a time to break it down.

$3(x + 7) - 3$

□ I can decide if a given number is a solution to an equation or inequality. (1.4)

Ex: $2x + 1 \geq 9$ is 3 a solution?

   *Plug it in and see if it works.

$2(3) + 1 \geq 9$
$6 + 1 \geq 9$
$7 \geq 9$
No, 7 isn't greater than 9

□ I can decide if a relationship represents a function by analyzing input and output. I am also sure that my reasoning makes sense. (1.6)

Ex: Does the following represent a function? Why or why not?

   *Each input can have only one output.

x	1	2	2	3
y	4	7	3	4

No, 2 has more than one output.

□ I can write a rule for a function using the $\Delta y/\Delta x$ method. (1.6)

Ex: Write a rule for the function:

*Find Δy and Δx. Set up a fraction with Δy on top
This number becomes the coefficient of x. Check to see if
The function works. If not adjust by adding or subtracting.
*Don't forget $\underline{y =}$!!!

x	-3	0	3	6	9
y	1	3	5	7	9

$$y = \frac{2}{3}x + 3$$

Chapter 2: Properties of Real Numbers

□ I can perform operations with integers. (2.2,2.3,2.4,2.6)

Ex: $-6 \cdot (-4) + 8$

*Review positive and negative rules

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□ I can apply the properties of absolute value and opposites. (2.1)

Ex: $-r + |3r|$ when $r = -4$

*Substitute first and remember that absolute value bars act
Like parenthesis (do inside first)

$$-(-4) + |3 \cdot (-4)|$$
$$4 + |-12|$$
$$16$$

□ I can perform operations involving fractions. (2.2/2.3)

Ex: a) $-2\frac{1}{3} + 4\frac{1}{5}$

*Change mixed to improper first then find LCD

$$\frac{-7}{3} + \frac{21}{5}$$

$$\frac{-35}{15} + \frac{63}{15}$$

$$\frac{28}{15} = 1\frac{13}{15}$$

*make improper, see if you can cross cancel, then multiply across

b) $3\frac{1}{2} \cdot 2\frac{1}{5}$

$$\frac{7}{2} \cdot \frac{11}{5} = \frac{77}{10} = 7\frac{7}{10}$$

*Multiply by the reciprocal

c) $\frac{3}{4} \div \frac{9}{8}$

$$\frac{3}{4} \cdot \frac{8}{9}$$

$$\frac{1}{2} \cdot \frac{2}{3}$$

$$\frac{2}{6} = \frac{1}{3}$$

□ I can combine like terms.   (2.5)   **Ex:** $3 - 4x - 2 + 7x$

    Pay attention to negative signs $1 + 3x$

□ I can apply the distributive property. (2.5)   **Ex:** $-4(2x - 5)$

    Hint: Rewrite subtraction as adding a negative! $-8x + 20$

□ I can simplify division problems. (2.5)   **Ex:** $\frac{9x-6}{-3}$

    Both pieces on top are being <u>divided</u> by the denominator $-3x + 2$

□ I can classify numbers as rational, irrational, integer or whole. (2.1)   **Ex:** a) $-3\frac{3}{4}$ b) $\sqrt{12}$

    a) Rational – it is a fraction
    b) Irrational – this would be
       a never ending and never
       repeating decimal which
       cannot be expressed as a
       fraction.

□ I can order real numbers. (2.7)   **Ex:** $-2.2, 2\frac{4}{5}, -\sqrt{12}, \sqrt{6}$

    Estimate square roots between two integers. $-\sqrt{12}, -2.2, \sqrt{6}, 2\frac{4}{5}$
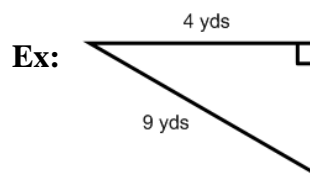   *the $\sqrt{6}$ is between 2 and 3, but closer to 2 since 6 is*
    Closer to 4 than 9. $2\frac{4}{5}$ is closer to 3 than 2 because 4/5 is more than half.

Chapter 11: Simplifying Radicals and Pythagorean Theorem

□ I can find the missing side of a right triangle. (11.4)   **Ex:**

    Right triangle = Pythagorean theorem = $a^2 + b^2 = c^2$
    don't forget the hypotenuse is always opposite the right angle

    $a^2 + b^2 = c^2$
    $4^2 + b^2 = 9^2$
    $16 + b^2 = 81$
    $b^2 = 65$
    Write answer in simplified radical form. $b = \sqrt{65}$

□ I can decide if three sides could possibly form a right triangle. (11.4)   **Ex:** 13, 12, 5

    Use the Pythagorean Theorem to decide. $a^2 + b^2 = c^2$
    Don't forget the longest side is the hypotenuse. $5^2 + 12^2 = 13^2$
        $25 + 144 = 169$

Chapter 3: Solve Linear Equations

☐ I can solve a one-step equation. (3.1)

    *Isolate the variable using inverse operations.

Ex: $4 - x = -9$

$$\underline{-4 \qquad -4}$$
$$-x = -13$$
$$x = 13$$

☐ I can use reciprocals to solve one-step equations. (3.1)

    *Multiply by the reciprocal.

Ex: $-\frac{3}{5}x = 12$

$$-\frac{5}{3} \cdot -\frac{3}{5}x = 12 \cdot -\frac{5}{3}$$
$$x = -20$$

☐ I can solve two-step equations. (3.2)

    *Use reverse PEMDAS to isolate the variable

Ex: $2x - 4 = 12$

$$\underline{+4 \qquad +4}$$
$$2x = 16$$
$$x = 8$$

☐ I can solve multi-step equations. (3.3)

    *Simplify before solving.

Ex: $4(x - 3) + 3 = 11$

$$4x - 12 + 3 = 11$$
$$4x - 9 = 11$$
$$4x = 20$$
$$x = 5$$

☐ I can solve equations with variables on both sides and interpret answers appropriately. (3.4)
*Don't forget to move variable terms to one side of equation by Adding or subtracting.

Ex: a) $2(x + 6) = 3(x + 4)$
$$2x + 12 = 3x + 12$$
$$\underline{-2x \qquad\qquad -2x}$$
$$12 = x + 12$$
$$\underline{-12 \qquad\quad -12}$$
$$0 = x$$

b) $4(x - 5) = 2(x + 3)$

$$4x - 20 = 2x + 6$$
$$\underline{-2x \qquad\qquad -2x}$$
$$2x - 20 = 6$$
$$2x = 26$$
$$x = 13$$

c) $6(3x + 6) = 9(2x + 4)$

$$18x + 36 = 18x + 36$$
$$\underline{-18x \qquad -18x}$$
$$36 = 36$$

All real numbers

d) $4(3x + 4) = 6(2x + 5)$
$$12x + 16 = 12x + 30$$
$$\underline{-12x \qquad -12x}$$
$$16 = 30$$

No Solution

□ I can solve a proportion (3.5/3.6)

Ex: $\dfrac{2}{2x+1} = \dfrac{4}{6x+1}$

$$2(6x + 1) = 4(2x + 1)$$
$$12x + 2 = 8x + 4$$
$$\underline{-8x \qquad -8x}$$
$$4x + 2 = 4$$
$$\underline{-2 \quad -2}$$
$$\frac{4x}{4} = \frac{2}{4}$$
$$x = \tfrac{1}{2}$$

□ I can solve a percent problem. (3.7)

Ex: 30 is 45% of what number?

*Use the percent proportion: $\dfrac{is}{of} = \dfrac{\%}{100}$

$$\frac{30}{x} = \frac{45}{100}$$

$$x = 66\tfrac{2}{3}$$

□ I can rewrite equations in function form. (3.8)
*Isolate y

Ex: $4x - 5y = 20$
$$\underline{-4x \qquad -4x}$$
$$\frac{-5y}{-5} = \frac{20 - 4x}{-5}$$
$$y = -4 + \tfrac{4}{5}x$$