

Quiz 2

Name: Key

Math 115, Fall 2016

Thursday Discussion Time: _____

Directions: You have 20 minutes to complete this quiz. Read each problem carefully. There are two problems on the reverse side. No calculators are allowed.

1. (2 points) Solve the following equation.

$$4|t+5| - 14 = 2$$

$$4|t+5| = 16 \Rightarrow |t+5| = 4 \Rightarrow t+5 = -4 \text{ or } t+5 = 4$$

$$t+5 = -4 \Rightarrow t = -9$$

$$t+5 = 4 \Rightarrow t = -1$$

$$\boxed{t = -9 \text{ or } t = -1}$$

2. (2 points) Solve the following inequality. Express your answer in interval notation and graph the solution set on the number line

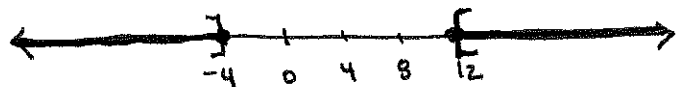
$$|x-4| - 2 \geq 6$$

$$|x-4| \geq 8 \Rightarrow x-4 \leq -8 \text{ or } x-4 \geq 8$$

$$x-4 \leq -8 \Rightarrow x \leq -4$$

interval $\boxed{(-\infty, -4] \cup [12, \infty)}$

$$x-4 \geq 8 \Rightarrow x \geq 12$$



3. (2 points) Use absolute value notation to write an inequality for the set of all real numbers whose distance from 5 is less than 10.

$$\boxed{|x-5| < 10}$$

4. (2 points) Find all of the real solutions of the following equation. Check your solutions.

$$\sqrt{2x-1} + 2 = x$$

$$\sqrt{2x-1} = x-2 \Rightarrow (\sqrt{2x-1})^2 = (x-2)^2 \Rightarrow 2x-1 = x^2 - 4x + 4$$

$$x^2 - 6x + 5 = 0 \Rightarrow (x-1)(x-5) = 0 \Rightarrow x=1 \text{ or } x=5$$

$$\underline{x=1} \quad \cancel{\sqrt{2(1)-1} + 2 = 1} \quad \sqrt{2(1)-1} + 2 = \sqrt{1} + 2 = 3 \neq 1$$

$$\underline{x=5} \quad \sqrt{2(5)-1} + 2 = \sqrt{9} + 2 = 3 + 2 = 5 \quad \checkmark$$

$$\boxed{\text{only } x=5}$$

5. (2 points) Two painters are available to paint a room. Working alone, the first painter can paint the room in 5 hours; the second painter in 4 hours. Find the time it takes both painters to paint the room working together.

Hint: Let t denote the desired time. Set up an equation based on how much of the room is painted in 1 hour.

In 1 hour,

$$\frac{1}{5} + \frac{1}{4} = \frac{1}{t}$$

$$\text{LCD} = 5 \times 4 \times t = 20t$$

$$20t \left(\frac{1}{5} + \frac{1}{4} \right) = 20t \left(\frac{1}{t} \right)$$

$$4t + 5t = 20 \Rightarrow 9t = 20 \Rightarrow \boxed{t = \frac{20}{9} \text{ hours}}$$