Instructor: J. McGuire
Name: Class: Math 118

Quiz 3

1. Express the interval in terms of an inequality and draw it on the real number line:

$$(4, \infty)$$

2. Simplify

$$\frac{x^7(6x)^2}{x^8}$$

3. Expand out and simplify:

$$(2+x)(1-x) - (2-x)(3+x)$$

Each problem is worth 2 points for a total of 6 points. Partial credit will be awarded.

1. Using the quadratic formula solve the equation:

$$x^2 + 5x - 6 = 0$$

Proof.

$$x = \frac{-5 \pm \sqrt{25+24}}{2} = \frac{-5 \pm 7}{2} = 1, -6$$

□

2. Solve for x:

$$\frac{1}{x-1} - \frac{2}{x^2} = 0$$

Proof.

$$\frac{1}{x-1} = \frac{2}{x^2} \iff x^2 = 2x-1 \iff x^2-2x+2 = 0 \iff x = \frac{+2 \pm \sqrt{4-4(2)}}{2(1)} = \frac{2 \pm \sqrt{-4}}{2} = 1 \pm i$$

□

3. Solve for x:

$$\sqrt{8x-1} = 3.$$

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Quiz 4

Proof.

$$8x - 1 = 9 \iff x = 10/8 = 5/4$$

□

1. During his major league career, Hank Aaron hit 41 more home runs than Babe Ruth hit during his career. Together they hit 1469 home runs. How many home runs did Babe Ruth hit?

   Solution. Let x be the number of homeruns that Babe Ruth hit and y be the number of homeruns that Hank Aaron hit. Then $y = 41 + x$ and $x + y = 1469$, so that $x + (41 + x) = 1469$, which gives us:

   $$41 + 2x = 1469 \iff 1428 = 2x \iff 714 = x.$$

   □

2. Find the distance between:

   $$P(6, -2) \qquad Q(-6, 2)$$

   Solution.

   $$\sqrt{(6+6)^2 + (4)^2} = \sqrt{144 + 16} = \sqrt{160}$$

   □

3. Give the equation of the line that goes through the points:

   $$P(-2, 5) \qquad Q(-1, -3)$$

   Solution. The slope of this will be:

   $$\frac{-3 - 5}{-1 + 2} = -8$$

   and then we'll have:

   $$y - y_0 = m(x - x_0) \iff y = 5 + -8(x + 2) \iff y = 5 - 8x - 16 = -8x - 11$$

   □

1. (4 points) The graph on the next page is on the viewing rectangle $[-5, 5] \times [-27, 4]$ (You can assume it keeps going up on the left and right sides):

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Quiz 6

(a) Does this graph describe a function?

(b) What is the range?

(c) What are the local maximum and minimums? (approximate values are okay)

(d) When is this increasing and when is this decreasing?

2. (2 points) What is the domain of the function:

$$f(x) = \sqrt{x^2 - 1}$$

1. (2 points) I leave San Luis Obispo at 12pm and drive for 4 hours at a constant rate of 70 miles per hour (I'm speeding a little bit). Let t be the time that I'm driving. What's a linear function that describes my distance from San Luis Obispo at time t?

2. (2 points) If $f(x) = 3x + 1$, what is

$$(f \circ f \circ f)(x)?$$

3. (2 points) Find the inverse of

$$f(x) = \frac{x - 2}{x + 1}$$

1. (2 points) Find the quotient and remainder of:

$$\frac{x^3 + 6x^2 + 9x}{x + 3},$$

you can use synthetic or long division.

2. (2 points) Find the maximum or minimum of:

$$-x^2 + 3x - 1,$$

write your answer as a point (x, y).

3. (2 points) What's the end behavior of

$$P(x) = x(x + 1)^3(x - 1)^2?$$

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Quiz 6