

Quiz #4

Math 130, Section 21, David Beydler

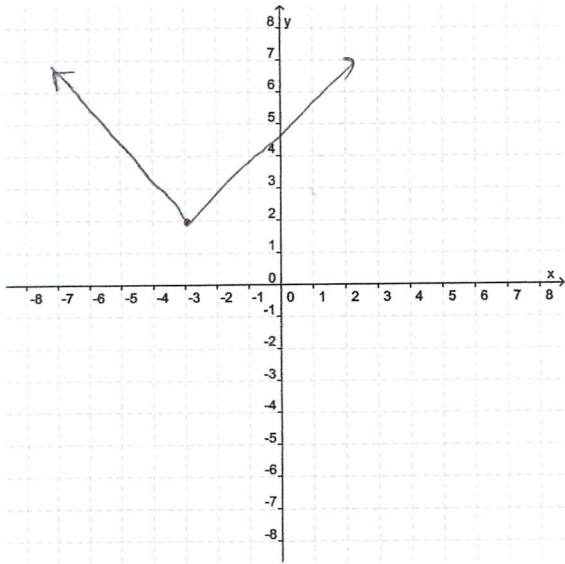
Name: Solutions
Wednesday, October 12, 2011

Directions: Show all work to get full credit. No calculators, books, notes. Please box your answers. Good luck!

(15 points total)

1. (2 points) Graph the function:

$$y = |x + 3| + 2$$



2. (1 point) Is $f(x) = -x^3 + 2x$ even, odd, or neither?

$$\begin{aligned} f(-x) &= -(-x)^3 + 2(-x) \\ &= x^3 - 2x \\ &= -(-x^3 + 2x) \\ &= -f(x) \end{aligned}$$

odd

3. (2 points) Without graphing, determine whether the following equation has a graph that is symmetric with respect to the x -axis, the y -axis, the origin, or none of these.

$$y = x^2 - x + 8$$

x -axis

$$-y = x^2 - x + 8$$

No

y -axis

$$\begin{aligned} y &= (-x)^2 - (-x) + 8 \\ y &= x^2 + x + 8 \end{aligned}$$

No

origin

$$\begin{aligned} -y &= (-x)^2 - (-x) + 8 \\ -y &= x^2 + x + 8 \end{aligned}$$

No

None of these

4. (4 points) Suppose $f(x) = \sqrt{x-1}$ and $g(x) = 3x$.

a. Find $(g \circ f)(x)$ and its domain.

$$(g \circ f)(x) = g(f(x)) = g(\sqrt{x-1}) = \boxed{3\sqrt{x-1}}$$

$$\text{Domain: } \boxed{[1, \infty)}$$

b. Find $(f - g)(5)$.

$$(f - g)(5) = f(5) - g(5) = \sqrt{5-1} - 3(5) = 2 - 15 = \boxed{-13}$$

c. Find $\frac{g(x+h)-g(x)}{h}$

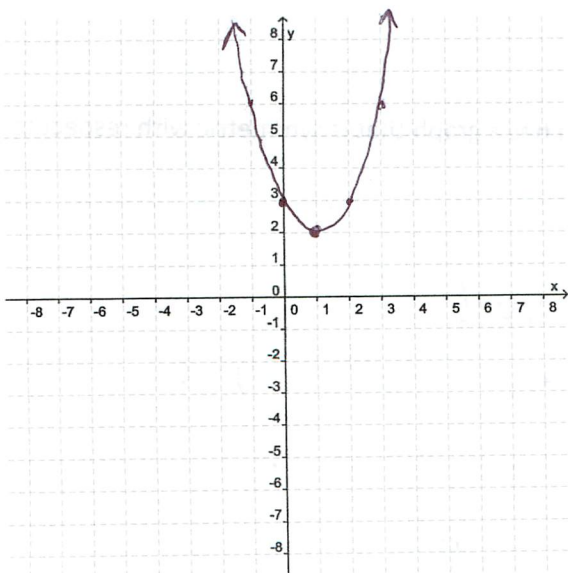
$$\begin{aligned} &= \frac{3(x+h) - 3x}{h} \\ &= \frac{3x + 3h - 3x}{h} \\ &= \frac{3h}{h} = \boxed{3} \end{aligned}$$

5. (2 points) Find function f and g such that $(f \circ g)(x) = \sqrt{x^2 - 1}$.

$$\boxed{\begin{aligned} f(x) &= \sqrt{x} \\ g(x) &= x^2 - 1 \end{aligned}}$$

6. (4 points) Graph the following quadratic equation. Also give the vertex, axis, domain, and range.

$$f(x) = x^2 - 2x + 3$$



Vertex:

$$x = -\frac{b}{2a} = \frac{-(-2)}{2(1)} = 1$$

$$f(1) = 1^2 - 2(1) + 3 = 2$$

Vertex at $\boxed{(1, 2)}$

axis: $\boxed{x = 1}$

Domain: \mathbb{R} , or $\boxed{(-\infty, \infty)}$

Range: $\boxed{[2, \infty)}$