Math 111I-006 Basic College Mathematics
Exam #2
October 22, 2014

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Answer the following questions. *You must show your work to receive full credit.* Be sure to make reasonable simplifications. Give exact answers unless otherwise specified. Indicate your final answer with a
boxed box .

Fill in the blank with the correct term. If there is more than one blank, you must get each correct to receive credit.

1. A relation is a function if each input corresponds to exactly one _____.

2. The variable y is _____ to the variable x if x and y are related by an equation of the form $y = kx$. The constant k is called the constant of proportionality.

3. Let $y = f(x)$. The value $f(b) - f(a)$ is called the _____ from $x = a$ to $x = b$.

4. The function f is _____ on an interval I if $f(a) < f(b)$ whenever $a < b$ in I. The function f is _____ on an interval I if $f(a) > f(b)$ whenever $a < b$ in I.

5. The set of all inputs for a function is called the _____. The set of all outputs is called the _____.

6. For an exponential growth model, the growth factor a is greater than 1. The _____, r, is positive and satisfies the equation $r = a - 1$.

7. The _____ of the function $y = f(x)$ between $x = a$ and $x = b$ is $\dfrac{f(b) - f(a)}{b - a}$.

8. The equation $y - y_1 = m(x - x_1)$ is called the _____ form of the equation of a line. The equation $y = mx + b$ is the _____ form of the equation of a line.
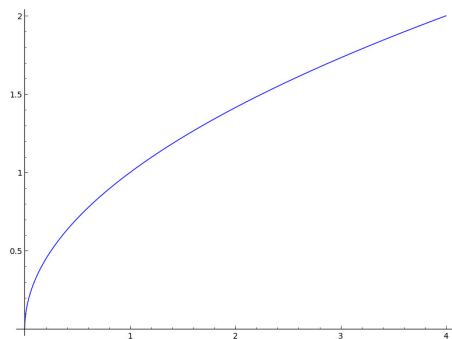
Solve the following.
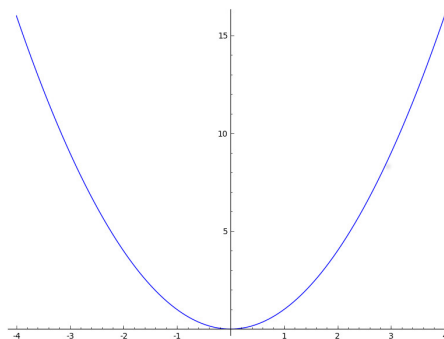9. Let $f(x) = x^3 - 6$. Find the average rate of change from $x = -1$ to $x = 2$.

10. Match the following functions with their graphs:
    a. $f(x) = |x|$, **b.** $f(x) = x^3$, **c.** $f(x) = x^2$, **d.** $f(x) = \sqrt{x}$
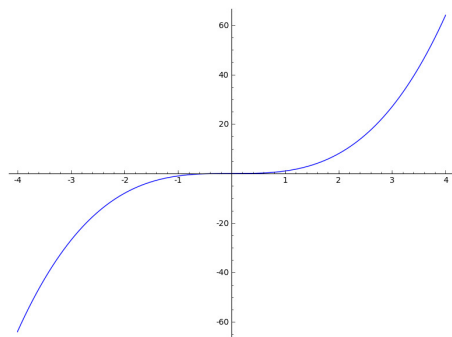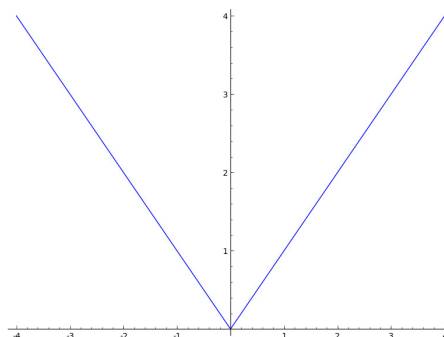
I.

II.

III.

IV.

11. Find the equation of the line that passes through the point $(3, 5)$ and is perpendicular to the line passing through $(-1, 4)$ and $(-1, 3)$.

12. Determine where, and if, the following two lines intersect: $y = \frac{-1}{2}x + 5$, $-x - 2y = 9$.

13. A population P is initially 300. Find an exponential growth model in terms of the number of time periods x if the growth *rate* is 10%.

14. Graph the following function. Plot at least three points on the graph. To receive full credit you may graph each transformation separately OR state the correct transformations in the following way: Horizontal Shift _____ units, Reflection over the _____-axis, etc.

$$f(x) = -(-x + 4)^3 - 5$$