

Name: _____
Pre-Calculus

Date: 10/20/14
Ms. Wilson

Unit 2: Polynomial, Power, and Rational Functions
Homework Packet #1 – Due 10/27/14

For questions 1-4, find the axis of symmetry, the vertex point, the y-intercept, and the x-intercept for each quadratic function.

1.) $f(x) = 3x^2 + 5x - 4$

2.) $f(x) = -2x^2 + 7x - 3$

3.) $g(x) = 8x - x^2 + 3$

4.) $h(x) = 6 - 2x + 4x^2$

5.) A large painting is 3 feet longer than it is wide. If the wooden frame is 12 inches wide, the area of the picture and the frame is 208 square feet, find the dimensions of the painting.

6.) As a promotion for a new ballpark, a competition is held to see who can throw a baseball the highest from the front row of the upper deck of seats, 83 feet above field level. The winner throws the ball with an initial velocity of 92 ft/sec and it lands on the infield grass.

- a.) Find the maximum height of the baseball.
- b.) How long is the ball in the air?
- c.) Determine its vertical velocity when it hits the ground.

7.) Interstate 70 west of Denver has a section posted as a 6% grade. This means that for a horizontal change of 100 feet there is a 6-foot vertical change.

- a.) Find the slope of this section of highway.
- b.) On a highway with a 6% grade, what is the horizontal distance required to climb 250 ft?
- c.) A sign along the highway says 6% grade for the next 7 miles. Estimate how many feet of vertical change there are along those 7 miles.

For questions 8-11, state the power and constant of variation of the function, graph it, and analyze it.

8.) $f(x) = 2x^4$

9.) $g(x) = \frac{1}{2}\sqrt[4]{x}$

10.) $h(x) = -3x^3$

11.) $k(x) = -2x^{-3}$

For questions 12-17, write the statement as a power function equation. Use k for the constant of variation if one is not given.

12.) The area A of an equilateral triangle varies directly as the square of the length s of its sides.

13.) The volume V of a circular cylinder with fixed height is proportional to the square of its radius.

14.) The current I in an electrical circuit is inversely proportional to the resistance R , with constant of variation V .

15.) Charles's Law state the volume V of an enclosed ideal gas at a constant pressure varies directly as the absolute temperature T .

16.) The speed p of a free-falling object that has been dropped from rest varies as the square root of the distance traveled d , with a constant of variation $k = \sqrt{2g}$.

17.) The energy E produced in a nuclear reaction is proportional to the mass m , with constant of variation being c^2 , the square of the speed of light.