Name: ___________________________________

11.Rev.1 ~ Power Functions

Past due on: __________ Period: ____

Write the initial equation, using k as the constant proportionality and then find the value of k. Write the new variation equation and use it to solve the problem.

1. The distance to the horizon, d, varies directly as the square root of the height, h, above ground level of the observer. If a person can see 6 miles from a height of 25 feet, how far can a person see from a height of 36 feet?

   INITIAL EQUATION CONSTANT OF PROPORTIONALITY NEW EQUATION SOLUTION

2. Radiation machines, used to treat tumors, produce an intensity of radiation, R, that varies inversely as the square of the distance, d, from the machine. At 3 meters, the radiation intensity if 62.5 milliroentgens per hour. What is the intensity at a distance of 2.5 meters?

   INITIAL EQUATION CONSTANT OF PROPORTIONALITY NEW EQUATION SOLUTION

3. Wind resistance or atmospheric drag tends to slow down moving objects. Atmospheric drag, D, varies jointly as an object's surface area, A, and velocity v. If a car traveling at a speed of 30 mph with a surface area of 34 square feet experiences a drag of 142.8 N (Newtons), how fast must a car with 36 square feet of surface area travel in order to experience a drag force of 241.92 N?

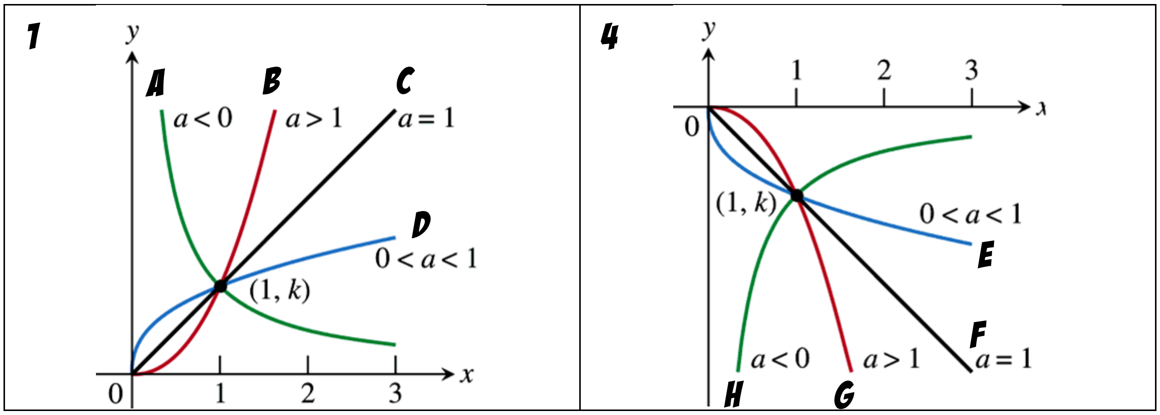
   INITIAL EQUATION CONSTANT OF PROPORTIONALITY NEW EQUATION SOLUTION

4. A pitcher's earned run average, A, varies directly as the number of earned runs, r, allowed and inversely as the number of innings, i, pitched. Joe Price had an earned run average of 2.55. He gave up 85 earned runs in 300 innings. What would his average be if he gave up 120 earned runs in 600 innings?

   INITIAL EQUATION CONSTANT OF PROPORTIONALITY NEW EQUATION SOLUTION

5. The force, F, of wind blowing on a window positioned at aright angle to the direction of the wind varies jointly as the area of the window, A, and the square of the wind's speed, s. It is known that a wind of 30 miles per hour blowing on a window measuring 4 feet by 5 feet exerts a force of 150 pounds. During a storm with winds of 60 miles per hour, should hurricane shutters be placed on a window that measures 3 feet by 4 feet and is capable of withstanding 300 pounds of force?

   INITIAL EQUATION CONSTANT OF PROPORTIONALITY NEW EQUATION SOLUTION



Rewrite each power function so that it is in the form $f(x) = kx^a$, then match the function to one of the curves above.

6. $f(x) = -3x \cdot 2\sqrt{x}$

7. $f(x) = \dfrac{\sqrt[5]{x^2}}{-4}$

8. $f(x) = \dfrac{(-3x^4)(2x^3)^2}{x^{12}}$

9. $f(x) = \sqrt[3]{\dfrac{8}{x^4}}$

Rewrite the function so that it is in the form $f(x) = kx^a$, then, state the values of the constants k and a. Describe the portion of the curve that lies in Quadrant I or Quadrant IV. Describe the end behavior.

10. $f(x) = (8x^9)^{2/3}$

REWRITE IN THE FORM kx^a $k =$ ______, $a =$ ______ $\lim_{x\to-\infty} f(x) =$ ______

CURVE: ______ CONTAINS THE POINT: ______ $\lim_{x\to\infty} f(x) =$ ______

PASSES THROUGH $(0,0)$ ASYMPTOTIC TO BOTH AXES

11. $f(x) = \dfrac{-1}{2x^5}$

REWRITE IN THE FORM kx^a $k =$ ______, $a =$ ______ $\lim_{x\to-\infty} f(x) =$ ______

CURVE: ______ CONTAINS THE POINT: ______ $\lim_{x\to\infty} f(x) =$ ______

PASSES THROUGH $(0,0)$ ASYMPTOTIC TO BOTH AXES

12. $f(x) = \dfrac{3\sqrt[3]{x^4}}{\sqrt[4]{x^5}}$

REWRITE IN THE FORM kx^a $k =$ ______, $a =$ ______ $\lim_{x\to-\infty} f(x) =$ ______

CURVE: ______ CONTAINS THE POINT: ______ $\lim_{x\to\infty} f(x) =$ ______

PASSES THROUGH $(0,0)$ ASYMPTOTIC TO BOTH AXES

13. $f(x) = \left(\dfrac{x^{-2}}{x^3}\right)^2$

REWRITE IN THE FORM kx^a $k =$ ______, $a =$ ______ $\lim_{x\to-\infty} f(x) =$ ______

CURVE: ______ CONTAINS THE POINT: ______ $\lim_{x\to\infty} f(x) =$ ______

PASSES THROUGH $(0,0)$ ASYMPTOTIC TO BOTH AXES