

**I. Determine which are power functions, circle YES or NO. If YES, state value of k and p.**

- 1.)  $f(x) = 13\sqrt[3]{x}$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 2.)  $3y = 9x^2$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 3.)  $f(x) = 2(x+5)^3$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 4.)  $y - 1 = 2x^2 - 1$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 5.)  $f(x) = \sqrt[25]{x^3}$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 6.)  $y = \sqrt[4]{81x^2}$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 7.)  $f(x) = 6 \cdot 3^x$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 8.)  $y = 4(x-2)(x+2) + 16$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 9.)  $y = 2x^3 + 5$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$
- 10.)  $y + 9 = (3-2x)(3+2x)$  power function? Circle one: YES NO where  $k = \underline{\hspace{1cm}}$  and  $p = \underline{\hspace{1cm}}$

**II. Find an equation of a power function that goes through the given two points. SHOW WORK!!**

11.) (3, 30) and (1, 5)	12.) (7, 8) and (1, 0.7)	13.) (6, 17) and (1, 2)
14.) (4, 3) and (9, 4.5)	15.) (6, 162) and (8, 384)	16.) $(2, \frac{64}{3})$ and $(-3, 243)$

**III. Complete each variation problem. MUST SHOW WORK FOR CREDIT!!**

17.) Suppose y is directly proportional to x. If $y = 6$ when $x = 4$ , find the constant of proportionality (k). Write a formula for y then use it to find x when $y = 8$ .	18.) Suppose y is inversely proportional to x. If $y = 2$ when $x = 3$ , find the constant of proportionality (k). Write a formula for y then use it to find x when $y = 8$ .
19.) Suppose c is directly proportional to the square of d. If $c = 45$ when $d = 3$ , find the constant of proportionality (k). Write a formula for c then use it to find c when $d = 5$ .	20.) Suppose h is inversely proportional to the cube of t. If $h = .002$ when $t = 5$ , find the constant of proportionality (k). Write a formula for h then use it to find t when $h = \frac{-1}{108}$ .

**IV. Complete each application problem below. MUST SHOW WORK FOR CREDIT!!**

21.) A 30-second commercial during Super Bowl XXXVI in 2002 cost advertisers 2 million dollars. For the first Super Bowl in 1967, an advertiser could have purchased approximately 22,989 minutes of advertising time for the same amount of money.  Write a function that expresses the above situation.	22.) A person's weight, w, on a planet of radius d, is given by $w = k \cdot d^{-2}$ where the constant k depends on the masses of the person and the planet.  A man weighs 180 lbs. on the surface of the earth. How much does he weigh on the surface of a planet whose mass is the same as the earth's, but whose radius is three times as large?
---	--