

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

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

11.) (3, 30) and (1, 5) $y = 5x^{1.631}$	12.) (7, 8) and (1, 0.7) $y = 7x^{1.232}$	13.) (6, 17) and (1, 2) $y = 2x^{1.174}$
14.) (4, 3) and (9, 4.5) $y = 1.5x^{.5}$ or $y = \frac{3\sqrt{x}}{2}$	15.) (6, 162) and (8, 384) $y = \frac{3}{4}x^3$	16.) $(2, \frac{64}{3})$ and $(-3, 243)$ $y = \frac{1}{3}x^6$

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. $y = 1.5x \rightarrow x = \frac{16}{3}$	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. $y = \frac{6}{x} \rightarrow x = \frac{3}{4}$
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. $c = 5d^2 \rightarrow c = 125$	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 = $\frac{-1}{108}$. $h = \frac{1}{4t^3} \rightarrow t = -3$

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. $y = 1449.97x^{1.077}$	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? 20165
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