Power Functions HW
Alg2 CC

Name Answers

POWER FUNCTIONS

Any function of the form: $f(x) = ax^b$ where a and b are real numbers not equal to zero.

Exercise #1: **For each of the following power functions, state the value of a and b by writing the equation in the form $y = ax^b$.**

(a) $y = \frac{3}{x^2} = 3x^{-2}$ $a=3$ $b=-2$

(b) $y = \frac{1}{7x^3} = \frac{1}{7}x^{-3}$ $a=\frac{1}{7}$ $b=-3$

(c) $y = 8\sqrt{x} = 8x^{\frac{1}{2}}$ $a=8$ $b=\frac{1}{2}$

(d) $y = \frac{6}{\sqrt[3]{x}} = 6x^{-1/3}$ $a=6$ $b=-\frac{1}{3}$

2) Fill in the values in the table below. Look for patterns as you do. (You may use your graphing calculator if you wish)

x	−3	−2	−1	0	1	2	3
x^2	9	4	1	0	1	4	9
x^3	−27	−8	−1	0	1	8	27
x^4	81	16	1	0	1	16	81
x^5	−243	−32	−1	0	1	32	243

3) What do you notice in the table above?

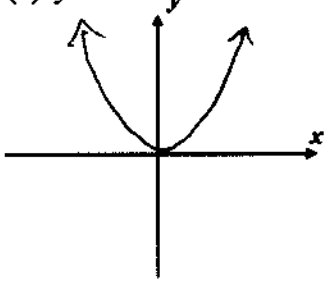
$y = x^2$ & $y = x^4$: $f(-x) = f(x)$

$y = x^3$ & $y = x^5$: $f(-x) = -f(x)$

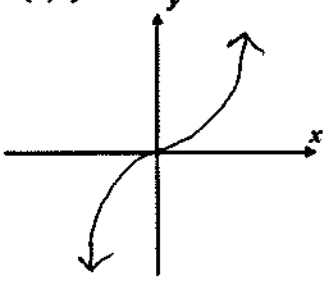
4) You may have noticed that when the power function has an even exponent, then positive and negative inputs (x values) have the **same outputs** (y values). When the power function has an odd exponent, then the positive and negative inputs (x values) have **opposite outputs** (y values).

Sketch each of these power functions without your calculator. What do you think the negative coefficient (i.e. a negative a value) will do in the last two?! (You may check your answers using your calculator if you wish!)

(a) $y = x^2$

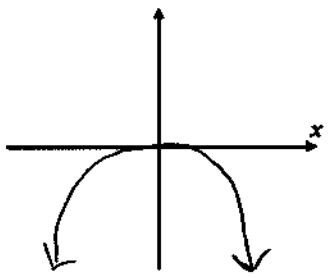


(b) $y = x^3$

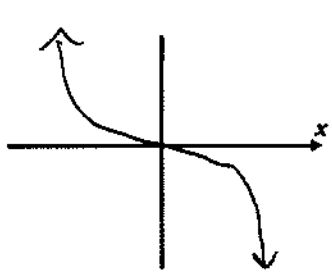


$a = -1$

(c) $y = -x^4$



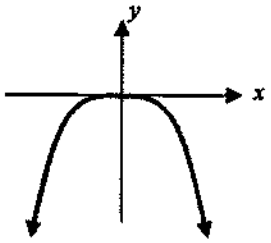
(d) $y = -x^5$



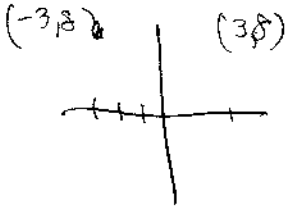
Exercise #5: Which of the following power functions is shown in the graph below? Explain your choice. Do without the use of your calculator.

(1) $y = -4x^7$ (3) $y = 6x^8$

(2) $y = -3x^{10}$ (4) $y = 5x^9$



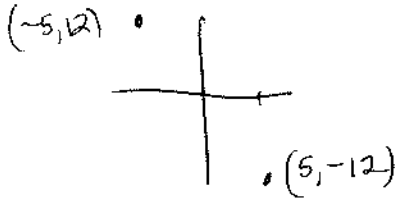
6) **If the point (-3, 8) lies on the graph of a power function with an even exponent, which of the following points must also lie its graph?**



(1) $(3,-8)$ (3) $(-3,-8)$

(2) $(3,8)$ (4) $(8,-3)$

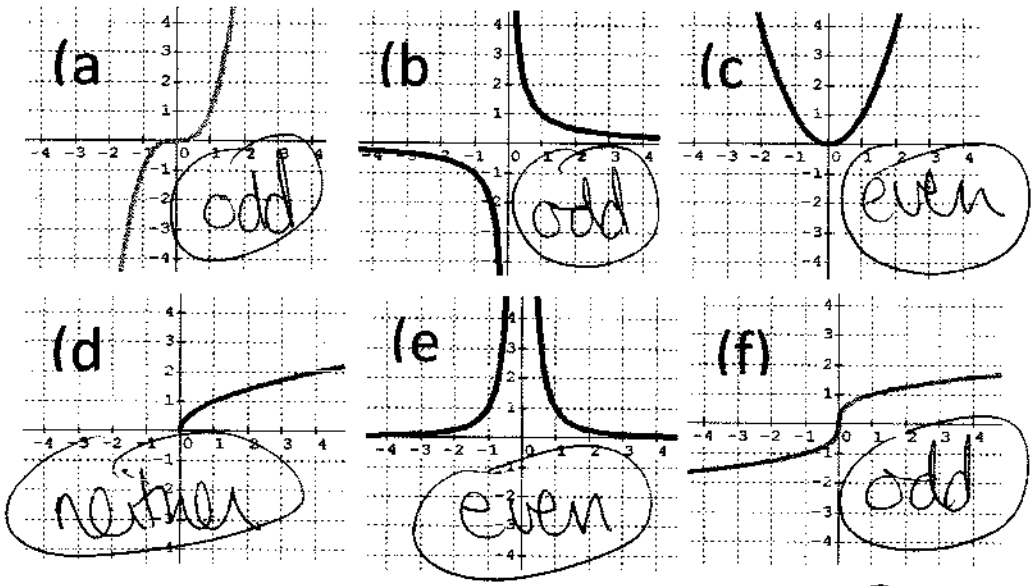
7) **If the point (-5, 12) lies on the graph of a power function with an odd exponent, which of the following points must also lie on its graph?**



(1) $(5,-12)$ (2) $(12,-5)$

(3) $(-5,12)$ (3) $(-12,5)$

8) Look at the power functions below and determine if they are odd, even, or neither. Then state the end behavior of each.



Function a: As $x \to \infty, y \to$ ∞. As $x \to -\infty, y \to$ $-\infty$ (Odd), Even, or Neither?

Function b: As $x \to \infty, y \to$ 0. As $x \to -\infty, y \to$ 0 (Odd), Even, or Neither?

Function c: As $x \to \infty, y \to$ ∞. As $x \to -\infty, y \to$ ∞ Odd, (Even), or Neither?

Function d: As $x \to \infty, y \to$ ∞. As $x \to -\infty, y \to$ N.A. Odd, Even, or (Neither)?

Function e: As $x \to \infty, y \to$ 0. As $x \to -\infty, y \to$ 0 Odd, (Even), or Neither?

Function f: As $x \to \infty, y \to$ ∞. As $x \to -\infty, y \to$ $-\infty$ Odd, Even, or Neither?