Name: ______________________________ Date: ________________

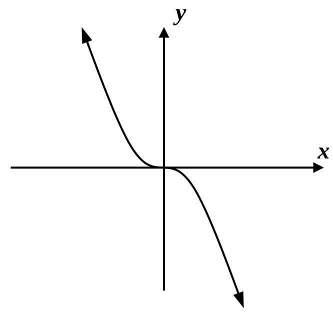
3-1 Power Functions
Homework

Fluency

1. **Without** using your calculator, determine which of the following equations could represent the graph shown below. Explain your choice.

(1) $y = x^2$ (2) $y = x^3$

(3) $y = -x^4$ (4) $y = -x^5$



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2. Identify which of the following are power functions. For each that is a power function, write it in the form $y = ax^n$, where a and n are real numbers. Placing them in these forms may take some mindful algebraic manipulation.

(a) $y = 3\sqrt[5]{x}$ (b) $y = 4x^5 - 7$ (c) $y = \dfrac{10}{x^5}$ (d) $y = \dfrac{6x^7}{2x^3}$

(e) $y = x^2 + 2x - 7$ (f) $y = \sqrt{48x^7}$ (g) $y = \sqrt{\dfrac{25}{x^4}}$ (h) $y = 2(x-3)^2$

3. 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) $(8, -3)$

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4. 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) $(-5,-12)$ (4) $(-12,5)$

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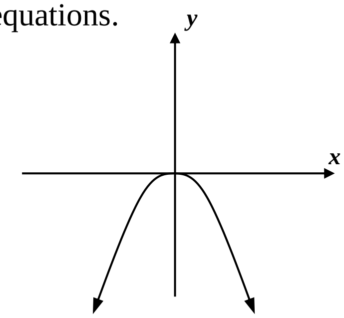
5. For each of the following polynomials, give a power function that best represents the end behavior of the polynomial.

(a) $y=3x^3-2x+12$ (b) $y=10-8x^2$ (c) $y=6x^5-4x^3+x-120$

(d) $y=-3x^5+2x^4-4x+7$ (e) $y=5x^4+2x^2$ (f) $y=-4x^5+8x^7-2x^3+3$

6 The graph below could be the long-run behavior for which of the following functions? Do this problem **without** graphing each of the following equations.



(1) $y=2x^2-7x+1$

(2) $y=4x^3+2x^2-6x+4$

(3) $y=-5x^4+3x^3-2x^2+x+9$

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

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Reasoning

7. Let's examine why end-behavior works a little more closely. Consider the functions $f(x)=x^3$ and $g(x)=x^3+2x^2+7x+10$.

(a) Fill out the table below for the values of x listed. Round your final column to the nearest *hundredth*.

x	$f(x)$	$g(x)$	$\frac{f(x)}{g(x)}$
5			
10			
50			
100			

(b) What number is the ratio in the fourth column approaching as x gets larger? What does this tell you about the part of $g(x)$ that can be attributed to the cubic term?