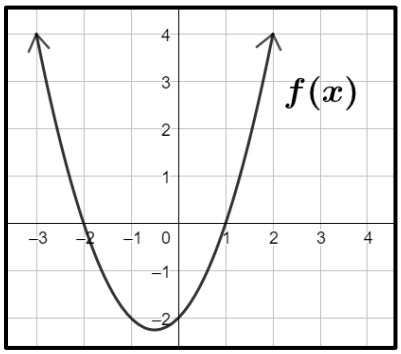
Worksheet A: (Topic 1.6) Polynomial End Behavior Name: Solutions

Directions: For 1– 8, use the graphs below to write limit statements for the end behavior for each function.

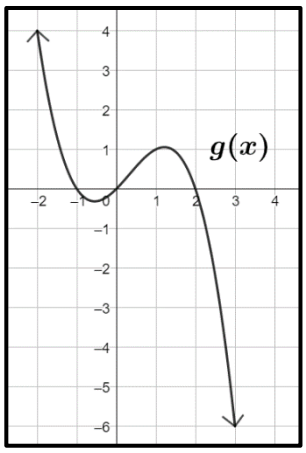
1.



Left: $\lim_{x\to-\infty} f(x) = \infty$

Right: $\lim_{x\to\infty} f(x) = \infty$

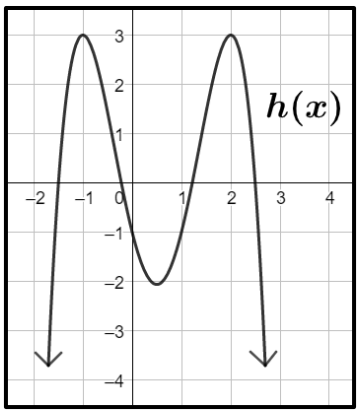
2.



Left: $\lim_{x\to-\infty} g(x) = \infty$

Right: $\lim_{x\to\infty} g(x) = -\infty$

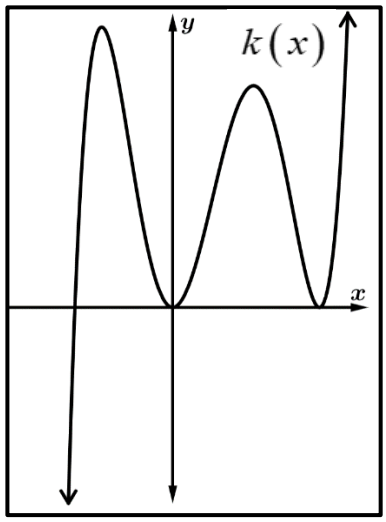
3.



Left: $\lim_{x\to-\infty} h(x) = -\infty$

Right: $\lim_{x\to\infty} h(x) = -\infty$

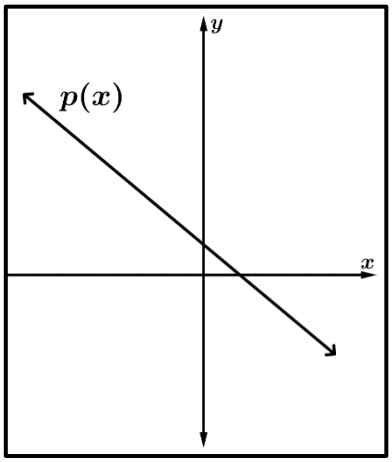
4.



Left: $\lim_{x\to-\infty} k(x) = -\infty$

Right: $\lim_{x\to\infty} k(x) = \infty$

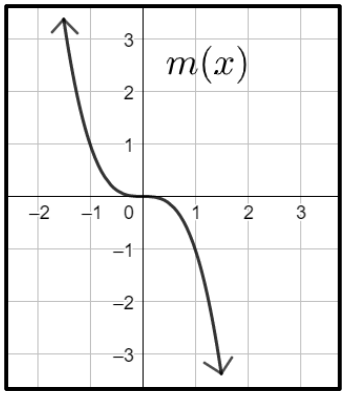
5.



Left: $\lim_{x\to-\infty} p(x) = \infty$

Right: $\lim_{x\to\infty} p(x) = -\infty$

6.



Left: $\lim_{x\to-\infty} m(x) = \infty$

Right: $\lim_{x\to\infty} m(x) = -\infty$

Directions: Determine the end behavior for the following polynomials.

7. $f(x) = -4x^3$

Left: $\lim_{x\to-\infty} f(x) = \infty$

Right: $\lim_{x\to\infty} f(x) = -\infty$

degree 3: Leading coefficient is negative so behaves opposite of an odd degree.

8. $g(x) = 3x^6$

Left: $\lim_{x\to-\infty} g(x) = \infty$

Right: $\lim_{x\to\infty} g(x) = \infty$

degree 6: Leading coefficient is positive so behaves like an even degree.

9. $y = 3(x-1)^5$

Left: $\lim_{x\to-\infty} y = -\infty$

Right: $\lim_{x\to\infty} y = \infty$

degree 5: Leading coefficient is positive so behaves like an odd degree.

10. $h(x) = 8 - 3x^4$

Left: $\lim_{x\to-\infty} h(x) = -\infty$

Right: $\lim_{x\to\infty} h(x) = -\infty$

degree 4: Leading coefficient is negative so behaves opposite of an even degree.

Solutions by Ted Gott tedg20776@gmail.com

Directions: Determine the end behavior for the following polynomials.

11. $k(x) = 8x^2 + 4 - x^5$

Left: $\lim_{x\to-\infty} k(x) = \infty$

Right: $\lim_{x\to\infty} k(x) = -\infty$

degree 5: Leading coefficient is negative so behaves opposite of an odd degree.

12. $m(x) = 2x(x-1)(x+6)$

Left: $\lim_{x\to-\infty} y = -\infty$

Right: $\lim_{x\to\infty} y = \infty$

degree 3: Leading coefficient is positive so behaves like an odd degree.

13. $p(x) = -2x(x-3)^2$

Left: $\lim_{x\to-\infty} p(x) = \infty$

Right: $\lim_{x\to\infty} p(x) = -\infty$

degree 3: Leading coefficient is negative so behaves opposite of an odd degree.

14. The graphs, equations, and limit statements for four polynomial functions are below. Match the graphs and equations with the correct limit statements.

Limit Statements

I. $\lim_{x\to-\infty} f(x) = \infty$, $\lim_{x\to\infty} f(x) = \infty$

II. $\lim_{x\to-\infty} g(x) = \infty$, $\lim_{x\to\infty} g(x) = -\infty$

III. $\lim_{x\to-\infty} h(x) = -\infty$, $\lim_{x\to\infty} h(x) = \infty$

IV. $\lim_{x\to-\infty} k(x) = -\infty$, $\lim_{x\to\infty} k(x) = -\infty$

Function Equations

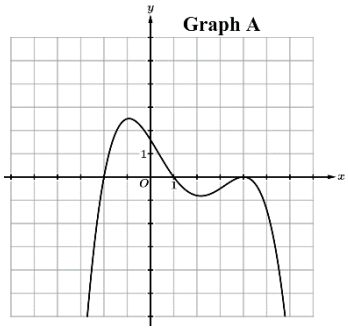
1. $y = x^3 + bx^2 + cx + d$

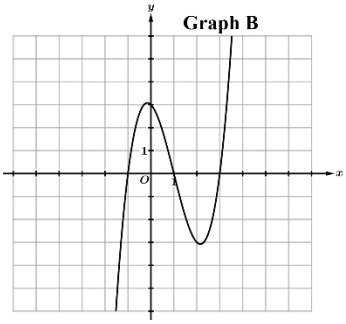
2. $y = -\frac{1}{20}x^4 + cx + d$

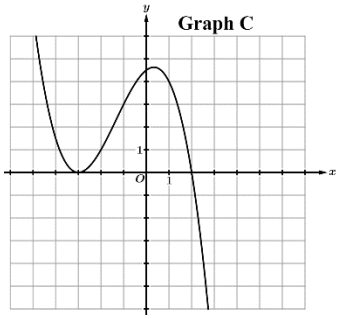
3. $y = \frac{1}{20}x^4 + bx^2 + d$

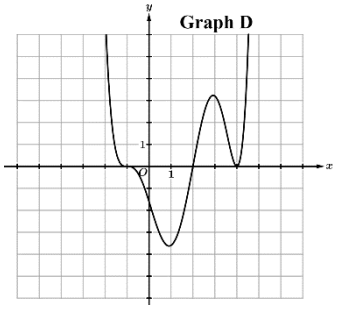
4. $y = -\frac{1}{4}x^3 + bx^2 + d$

Graphs









Limit Statement: I	**Limit Statement: II**	**Limit Statement: III**	**Limit Statement: IV**
Equation: 3	**Equation: 4**	**Equation: 1**	**Equation: 2**
Graph: D	**Graph: C**	**Graph: B**	**Graph: A**