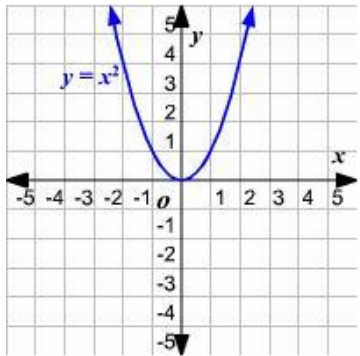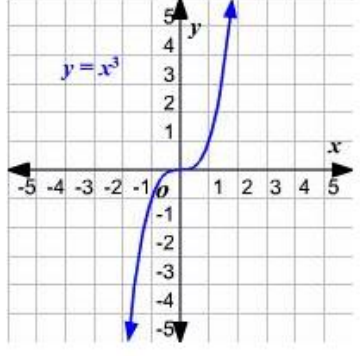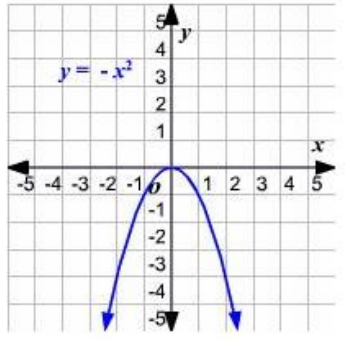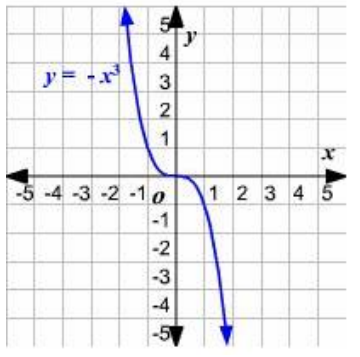# The Leading-Term Test

The theory states: If $a_n x^n$ is the leading term of a polynomial function, then the behavior of the graph as $x \rightarrow \infty$ and as $x \rightarrow -\infty$ can be described in one of the four following ways:

Degree	Leading Coefficient		Degree	Leading Coefficient	
Even	Positive	Example: $f(x) = x^2$ A	Odd	Positive	Example: $f(x) = x^3$ C
Even	Negative	Example: $f(x) = -x^2$ B	Odd	Negative	Example: $f(x) = -x^3$ D

For the following functions, determine the degree of the function, the leading term coefficient, and match the functions to graph A, B, C, or D.

1. $f(x) = 6x^2 + 2x + 3$ Degree: Leading Term: Graph =

2. $x^3 - 3$ Degree: Leading Term: Graph =

3. $f(x) = -x^3 - x^2 + x + 2$ Degree: Leading Term: Graph =

4. $f(x) = -x^2 + x - 5$ Degree: Leading Term: Graph =

5. $f(x) = -x^2 + 5x + 1$ Degree: Leading Term: Graph =

6. $f(x) = -x^3 + x - 6$ Degree: Leading Term: Graph =

Answers:

1. Degree: Even   Leading Term: Positive   Graph = A
2. Degree: Odd   Leading Term: Positive   Graph = C
3. Degree: Odd   Leading Term: Negative   Graph = D
4. Degree: Even   Leading Term: Negative   Graph = B
5. Degree: Even   Leading Term: Negative   Graph = B
6. Degree: Odd   Leading Term: Negative   Graph = D