

Lesson 2.1: Basics of Polynomials

Standard Form: writing a polynomial with the term with the highest exponent is written first, the second highest exponent 2nd, and so on.

Leading Coefficient: the number written in front of the variable with the largest exponent.

Degree: The highest exponent on the variable.

For each of the following polynomials, find the degree and number of terms.

Write in standard form.

Example 1: $-6x + x^2 + 3x - 5 - 3x^2$

$$\boxed{-2x^2 - 3x - 5}$$

Degree: 2

Terms: 3

* Example 2: $x^2(x^4 - 3x^2 + x - 1)$

$$\boxed{x^6 - 3x^4 + x^3 - x^2}$$

Degree: 6

Terms: 4

For each of the following polynomials, find the degree and number of terms.

Example 3: $x(x - 1) - 3(x + 2)$

$$x^2 - x - 3x - 6$$

$$\boxed{x^2 - 4x - 6}$$

Degree: 2

Terms: 3

* Example 4: $-7x^0$

$$\boxed{-7}$$

Degree: 0

Terms: 1

End Behavior

$$y = x^{\textcircled{1}}$$



$$y = x^2$$



$$y = x^{\textcircled{3}}$$



$$y = x^4$$



$$y = x^{\textcircled{5}}$$



L.C.

$$y = \ominus x^2$$



	Even (degree)	Odd (degree)
Positive (Leading Coefficient)	↑↑	↓↑
Negative (Leading Coefficient)	↓↓	↑↓

Determine the end behavior of the graph of each polynomial function.

Example 5: $y = 3x^7 - 2x^2 + 5x^{15} = \underline{-5x^{15}} + 3x^7 - 2x^2$

Degree: 15 (odd)

L.C.: 5 (+)



* Example 6: $y = 4x^2 + 5x - 10x^4 + 6x^4$

$y = \underline{-4x^4} + 4x^2 + 5x$

D: 4 (even)

L.C.: -4 (-)



For the following polynomials, find the y-intercept:

Example 7: $y = 3x^7 - 5x^4 + 2x - 15$

Replace each x with 0.

$$y = \underbrace{3(0)^7} - \underbrace{5(0)^4} + \underbrace{2(0)} - 15$$

$$y = -15$$

Example 9: Determine the degree of the following polynomial:

X	Y
-3	-18
-2	-4
-1	0
0	0
1	2
2	12
3	36

1st Difference

2nd Difference

3rd Diff.

1st Difference: -14, -4, 0, -2, -10, -24

2nd Difference: -10, -4, 2, -8, -14

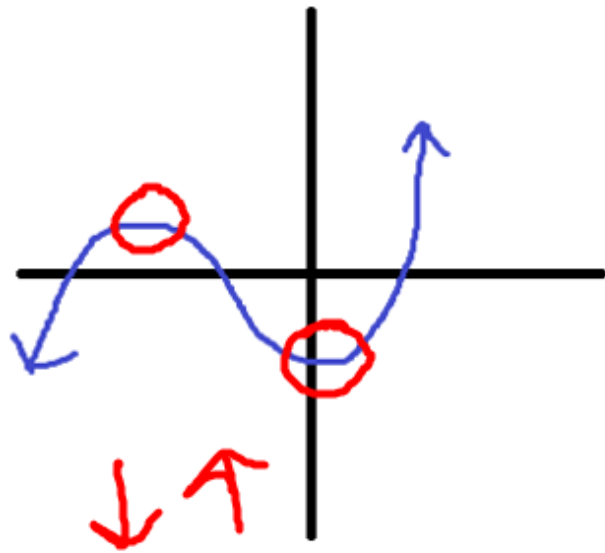
3rd Diff.: -6, -6, -6, -6

D: 3

Example 10: Determine the degree and leading coefficient

(D)

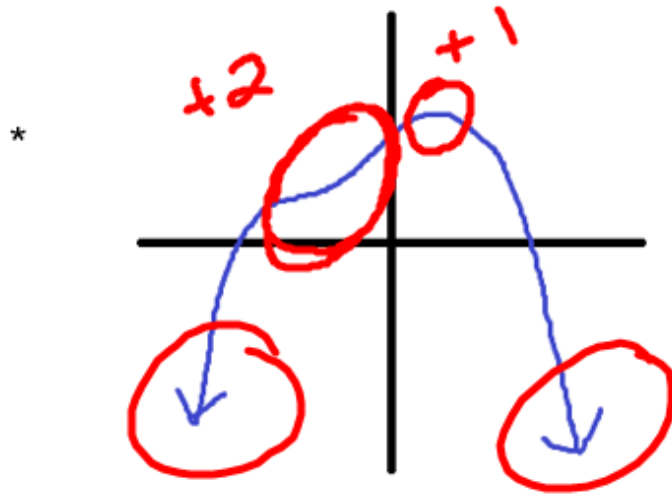
(LC)



D: (odd) 3

(1 more than
the number of
turning points)

L.C.: +



3 turning points

$+1$
 D: (even): 4
 LC: -