

## Types of Polynomials and Their End Behavior

<p>1. Classify the polynomial by giving the degree and name, then describe its end behavior. Tell how many possible zeros it will have on the graph.</p> $g(x) = x^3 + x + 3$	<p>2. Classify the polynomial by giving the degree and name, then describe its end behavior. Tell how many possible zeros it will have on the graph.</p> $p(x) = x^5 - 3x^3 + 2$
<p>3. Classify the polynomial by giving the degree and name, then describe its end behavior. Tell how many possible zeros it will have on the graph.</p> $m(x) = 4x - 9 - x^3$	<p>4. Classify the polynomial by giving the degree and name, then describe its end behavior. Tell how many possible zeros it will have on the graph.</p> $h(x) = -x^4 + 3x^3 - x + 5$
<p>5. Describe the end behavior of this function. Tell how many possible zeros it will have on the graph.</p> $q(x) = x^6 - 2x^5 - 2x^3 + x + 5$	<p>6. Describe the end behavior of this function. Tell how many possible zeros it will have on the graph.</p> $h(x) = 5 + 3x^2 - x^7$

7. Evaluate the polynomial using synthetic division. Show your work.

$$f(x) = -2x^4 + 6x^3 - 3x + 11; x = 4$$

8. Use Synthetic Division to divide the polynomials. Show your work and write your answer in the correct form.

$$(x^4 + 4x^3 + 16x - 35) \div (x + 5)$$

9. Divide the polynomials using Long Division. Show your work and write your answer in the correct form.

$$(4x^4 + 5x - 4) \div (x^2 - 3x - 2)$$

10. When dividing  $(x^3 - 5x + 3)$  by  $(x - 2)$  I made a mistake. Describe the mistake in my synthetic division. Give the correct answer.

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -5 & 3 \\ & & 2 & 4 & -2 \\ \hline & 1 & 2 & -1 & 1 \end{array}$$

$$\frac{x^3 - 5x + 3}{x - 2} = x^3 + 2x^2 - x + 1$$

Answers in random order

4, quartic, down/down, 4	??	3, cubic, up/down, 3	5, quintic, down/up, 5	$x^3 - x^2 + 5x - 9 + \frac{10}{x + 5}$
Up/down, 7	-129	3, cubic, down/up, 3	Up/up, 6	$4x^2 + 12x + 44 + \frac{161x + 84}{x^2 - 3x - 2}$

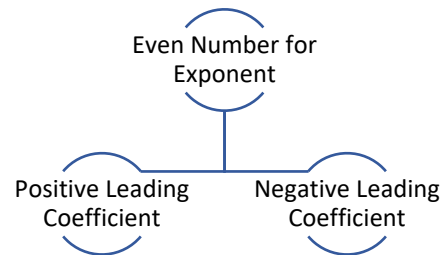
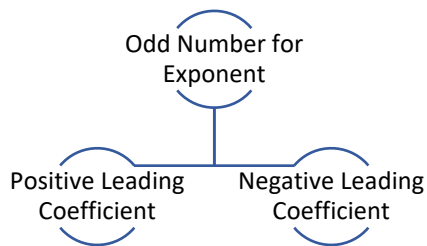
Notes: Classifying Polynomials by their Degree and Type. Describing End Behavior and Number of Possible Zeros.

Common Polynomial Functions		
Degree	Type (Name)	Example
0		$f(x) = -14$
1		$f(x) = 5x - 7$
2		$f(x) = 2x^2 + x - 9$
3		$f(x) = x^3 - x^2 + 3x$
4		$f(x) = x^4 + 2x - 1$
5		

Note: the degree tells how many POSSIBLE zeros the graph of the function will have.

End Behavior:

Look at the LARGEST exponent in the polynomial (it may not be listed first). Is that number even or odd?



Example: Classify the polynomial by giving the degree and name, then describe its end behavior. Tell how many possible zeros it will have on the graph.

a)  $f(x) = 2x^4 - 8x^3 + x^2 + 7x - 1$

degree:

name (type):

positive or negative leading coefficient?

Even or odd degree?

end behavior:

# of possible zeros:

b)  $f(x) = x^3 - 3x^5 - 4$

degree:

name (type):

positive or negative leading coefficient?

Even or odd degree?

end behavior:

# of possible zeros: