Math 3

Get out your homework

Simplify the expression

7) $(5a+4)+(5a+3)$

8) $(3x^4-3x)+(3x+3x^4)$

$6x^4-6x$

9) $(-4k^4+14k^2+3k^2)+(-3k^4-14k^2-8)$

$-7k^4-11k^2+6$

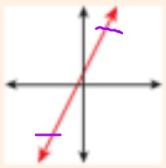
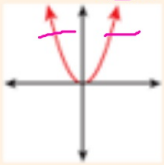
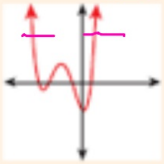
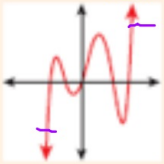
10) $(3-6n^5-8n^4)+(-6n^4+3n+8n^5)$

$2n^5-2n^4+3n+$

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

Polynomial functions are classified by their degree. The graphs of polynomial functions are classified by the degree of the polynomial. Each graph, based on the degree, has a distinctive shape and characteristics.

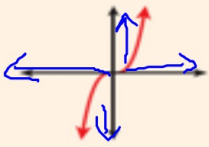
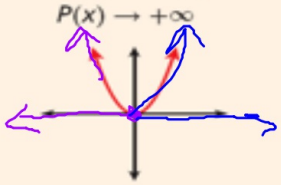
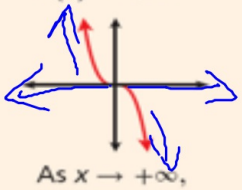
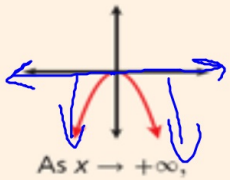
Graphs of Polynomial Functions

Linear function Degree 1	Quadratic function Degree 2	Cubic function Degree 3	Quartic function Degree 4	Quintic function Degree 5
				

End behavior is a description of the values of the function as x approaches infinity ($x \to +\infty$) or negative infinity ($x \to -\infty$). The degree and leading coefficient of a polynomial function determine its end behavior. It is helpful when you are graphing a polynomial function to know about the end behavior of the function.

Investigating Graphs of Polynomial Functions

Polynomial End Behavior

$P(x)$ has...	Odd Degree	Even Degree
Leading coefficient $a > 0$ positive	As $x \to +\infty$, $P(x) \to +\infty$  As $x \to -\infty$, $P(x) \to -\infty$	As $x \to -\infty$, $P(x) \to +\infty$  As $x \to +\infty$, $P(x) \to +\infty$
Leading coefficient $a < 0$ negative	As $x \to -\infty$, $P(x) \to +\infty$  As $x \to +\infty$, $P(x) \to -\infty$	As $x \to -\infty$, $P(x) \to -\infty$  As $x \to +\infty$, $P(x) \to -\infty$

Example 1: Determining End Behavior of Polynom Functions

Identify the leading coefficient, degree, and end behavior.

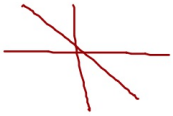
A. $Q(x) = -x^4 + 6x^3 - x + 9$

leading coefficient: -1

degree: 4

as $x \to -\infty$, $Q(x) \to -\infty$

as $x \to +\infty$, $Q(x) \to -\infty$



Complete the table to identify the leading coefficient, degree, and end behavior of each polynomial function.

positive even, negative odd

	Polynomial	Leading Coefficient	Degree	End Behavior
1.	$P(x) = x^2 + 3x + 6$	1	2	As $x \to -\infty$, $P(x) \to +\infty$ As $x \to +\infty$, $P(x) \to +\infty$
2.	$P(x) = -3x^3 + 2x - 5$	-3	3	As $x \to -\infty$, $P(x) \to +\infty$ As $x \to +\infty$, $P(x) \to -\infty$
3.	$P(x) = 2x^4 + 2x^3 + 3$	2	4	As $x \to -\infty$, $P(x) \to +\infty$ As $x \to +\infty$, $P(x) \to +\infty$
4.	$P(x) = -6x^5 + 3x^3 + 1$	-6	5	As $x \to -\infty$, $P(x) \to +\infty$ As $x \to +\infty$, $P(x) \to -\infty$