

UNIT 5 LESSON 1 INVESTIGATION 1 NOTES

Lesson Vocabulary

Polynomial - Any function written in standard form (descending exponent order).

Degree of a polynomial - The largest exponent of the polynomial

Degree	Name	max/min	# of Points
2	Quadratic	1	3
3	Cubic	2	4
4	Quartic	3	5
5	Quintic	4	6

Max, min, Zeros - Same as above

y-intercept - Where the graph crosses the y-axis.

To find, plug zero in for x and solve for y.

End Behavior - The behavior of the function as it approaches  $-\infty$  and  $+\infty$ . ( $y$ -values left and right)

degree	leading coefficient	$x \rightarrow -\infty, x \rightarrow +\infty$ Left, Right	example
even	+	$+\infty, +\infty$	
even	-	$-\infty, -\infty$	
odd	+	$-\infty, +\infty$	
odd	-	$+\infty, -\infty$	

Example Problem(s)

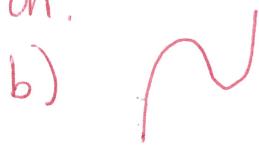
ex.) What is the degree and type of the polynomial function.

a)  $x^4 - 3x^5 + 4x^3$

$-3x^5 + x^4 + 4x^3$

degree = 5

Quintic



degree = 3

Cubic

ex.) Find the max/min, zeros and y-int.

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

max:  $y = 4.94$

min:  $y = -2.91, y = 2.62$

zeros:  $x = -2.79, x = -1.67$

y-int:  $f(x) = 0^4 + 3(0)^3 - 0^2 - 3(0) + 4$   
 $(0, 4)$

ex.) Describe the end behavior

a)  $-x^4 + 3x^2 + 1$

$x \rightarrow -\infty, f(x) \rightarrow -\infty$

$x \rightarrow +\infty, f(x) \rightarrow -\infty$

$(-\infty, -\infty)$

b)  $x^5 + 3x^2 + 1$

$x \rightarrow -\infty, f(x) \rightarrow -\infty$

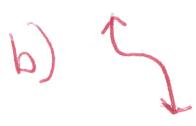
$x \rightarrow +\infty, f(x) \rightarrow +\infty$

ex.) Describe the degree and coeff. of the function according to the end behavior.



degree: even

coeff.: neg.



degree: odd

coeff.: neg.

Lesson VocabularyCYU pg. 326ai)  $f(x)$  - degree of 3, Cubic $g(x)$  - degree of 4, Quarticaii)  $f(x)$ : max (-2, 46), min (-0.2, -2.3) $g(x)$ : max (2, 20), min (0, 4) (4, 4)

b) Quartic, need 5 points

 $(0, 0) (2, 4) (3, 0) (4, 4) (6, 0)$ 

$$f(x) = -0.5x^4 + 6x^3 - 22.5x^2 + 27x$$

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a) Any function written in standard form

b) The largest exponent of the polynomial

c) max - the highest point of the graph

min - the lowest point of the graph

The # of max/min is always one less than the degree.

d) one more point than the degree of the function.

Extra: By looking at a graph, how do you know what kind of function it is?

By the # of max/min. The degree is one more than the # of max/min.