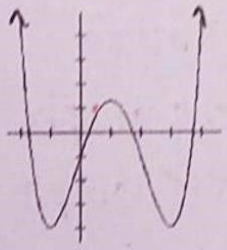
Characteristics of Polynomials

Degree (highest exponent)	Name (# of terms)
Linear (x)	Monomial (1 term)
Quadratic (x^2)	Binomial (2 terms)
Cubic (x^3)	Trinomial (3 terms)
Quartic (x^4)	Polynomial (4+ terms)
Quintic (x^5)	

Range is: y-values

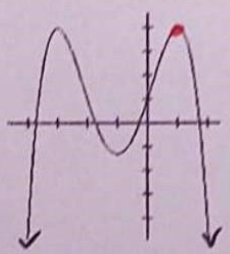
Ends of the graph point up:



→ of lowest point

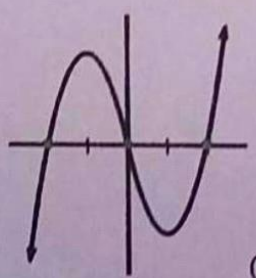
[y , ∞)

Ends of the graph point down:



(-∞ , y] ← at highest point

Ends of the graph point opposite:



(-∞ , ∞)

Domain is ALWAYS: (-∞ , ∞)

Intercepts:

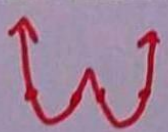
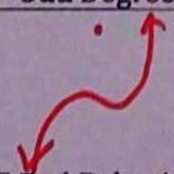
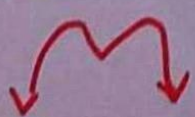
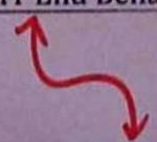
x-intercept(s): crosses x-axis (#, 0)

y-intercept: crosses y-axis (0, #)

Symmetry:

EVEN	ODD	NEITHER
y-axis cuts in half	goes through origin, 180° rotation	doesn't follow either
All even exponents	All odd exponents	Mixture of even/odd

End behavior (based on what the graph/equation looks like):

	Even Degree	*Odd* Degree
+ leading coefficient (LC)	 LEFT End Behavior: ∞ RIGHT End Behavior: ∞	 LEFT End Behavior: −∞ RIGHT End Behavior: ∞
− leading coefficient (LC)	 LEFT End Behavior: −∞ RIGHT End Behavior: −∞	 LEFT End Behavior: ∞ RIGHT End Behavior: −∞

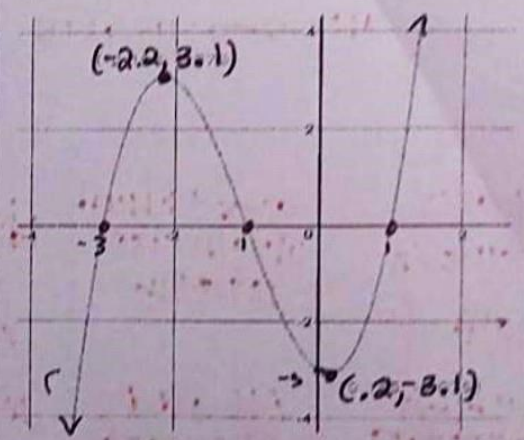
		Even Degree	Odd Degree
Absolute Maximum:	very top of graph	highest	None
Absolute Minimum:	very bottom of graph.	lowest	None
Relative Maximum:	"hills"		
Relative Minimum:	"valleys"		
Interval of increase:	where graph is increasing } x-values		
Interval of decrease:	where graph is decreasing }		

Examples:

Identify the characteristics of the given graphs:

Degree & Name	3, Cubic	Absolute Maximum	None
Domain	$(-\infty, \infty)$	Relative Maximum	(-2.2, 3.1)
Range	$(-\infty, \infty)$	Absolute Minimum	None
y-intercept	(0, -3)	Relative Minimum	(.2, -3.1)
x-intercept(s)	(3, 0), (-1, 0) (1, 0)	Interval of Increase	$(-\infty, -2.2)$ & $(.2, \infty)$
Left end behavior	As $x \to -\infty$, $y \to -\infty$	Interval of Decrease	-2.2, 2.2
Right end behavior	As $x \to \infty$, $y \to \infty$	Symmetry (even, odd, Neither)	N

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



Degree & Name	4, Quartic	Absolute Maximum	None
Domain	$(-\infty, \infty)$	Relative Maximum	(-.5, .563)
Range	$(\infty, -1]$	Absolute Minimum	(1.618, -1) & (.618, -1)
y-intercept	(0, 0)	Relative Minimum	(-1.618, -1) & (.618, -1)
x-intercept(s)	(-2, 0) (-1, 0) (0, 0) (1, 0)	Interval of Increase	$(-1.618, -.5)$ & $(.618, \infty)$
Left end behavior	As $x \to -\infty$, $y \to \infty$	Interval of Decrease	$(-\infty, -1.618)$ & $(-.5, .618)$
Right end behavior	As $x \to \infty$, $y \to \infty$	Symmetry (even, odd, Neither)	N

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