Keeper 9 Name: _____

Characteristics of polynomial graphs Date: _____ Period: _____

Domain: All the inputs for the function, all of the x values.

Polynomial domains are always the same, all real numbers $(-\infty, \infty)$

Range: All the outputs for the function, all the y values.

Polynomial domains change depending on the graph.

a. If both ends are going up, then it is $[lowest\ y\ value, \infty)$
b. If both ends are going down, then it is $(-\infty, highest\ y\ value]$
c. If ends are going opposite directions, then it is $(-\infty, \infty)$

Intervals of increase and decrease: break down of the domain(x values) into segments where your graph is increasing (going uphill) and decreasing (going downhill).

Absolute Maximum: The HIGHEST point on the graph. No points on the graph are above this point. (Only exists when both ends of the graph are going down)

Absolute Minimum: The LOWEST point on the graph. No points on the graph are below this point. (Only exists when both ends of the graph are going up)

Relative Maximum: Any points that are at the top of an increase transition to decrease. There can be other points that go above them. They are maximums for that section of the graph.

Relative Minimum: Any points that are at the bottom of a decrease transition to increase. There can be other points that go below them. They are minimums for that section of the graph.

Y – intercept: the point where the graph crosses the y axis. Always written as an ordered pair (0, y).

X – intercept: the point(s) where the graph crosses the x axis. Always written as an ordered pair (x, 0).

Zeros: the list of the x values of the x intercepts. These are also called roots or solutions to the function. The degree tells you how many roots or solutions you are looking for when you are solving the functions.

End Behavior: What are the ends of the graph doing? There are two ends, the left and the right. There are 4 cases:

Degree			
Leading Coefficient		ODD	EVEN
	Positive	Right: Rises Left: Falls	Right: Rises Left: Rises
	Negative	Right: Falls Left: Rises	Right: Falls Left: Falls
	Rise +∞		
	Falls -∞		

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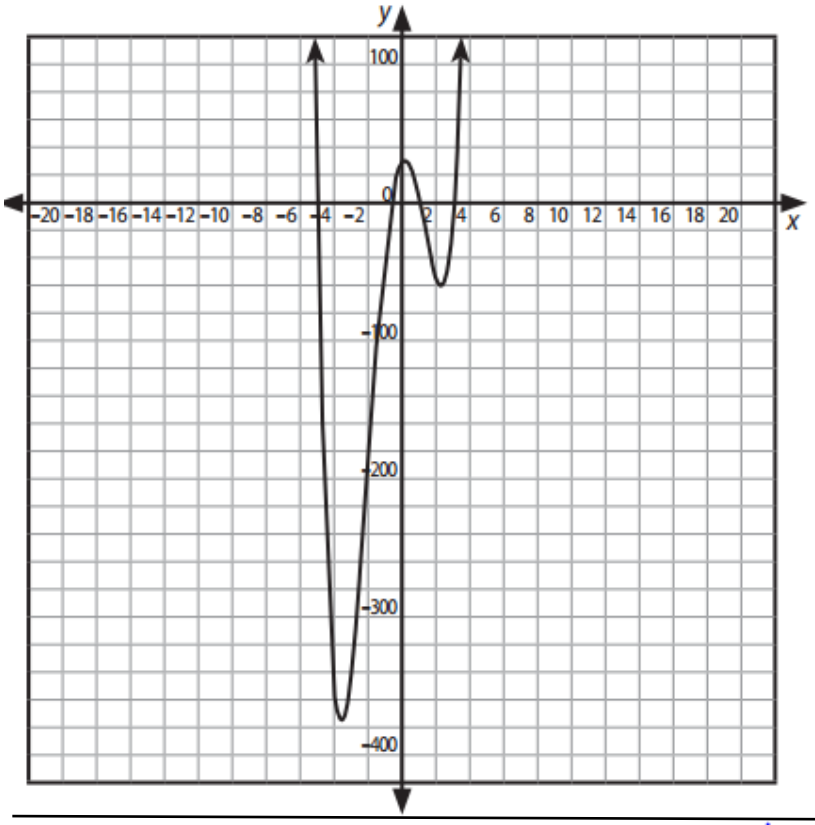
Example 1



Domain: $(-\infty, \infty)$

Range: $[-380, \infty)$

Intervals of increase: $(-3, 0)$ $(2, \infty)$

Intervals of decrease: $(-\infty, -3)$ $(0, 2)$

Absolute Max: NONE

Absolute Min: (- 3, - 380)

Relative Max: (0, 30)

Relative Min: (2, - 60)

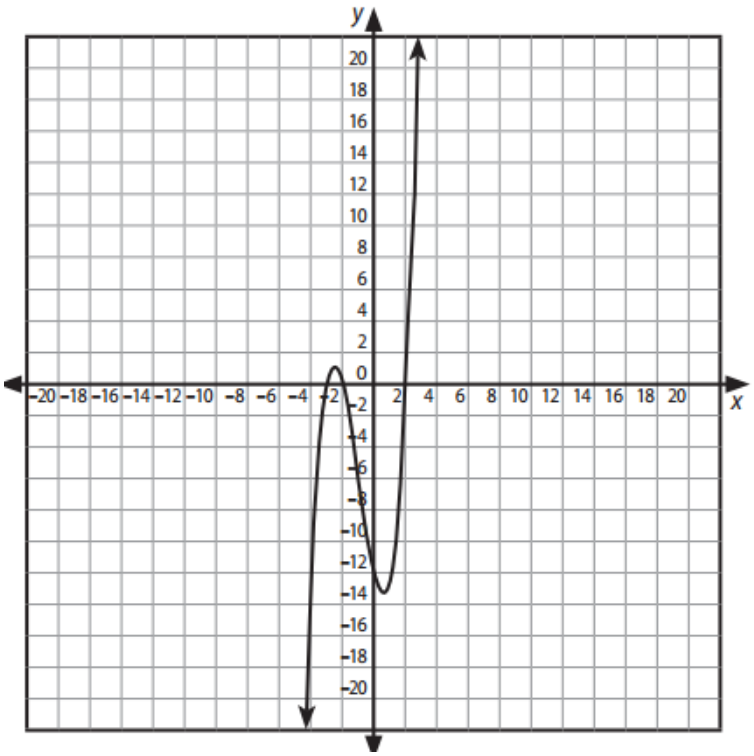
Y-intercept: (0, 30)

X-intercept: (-5, 0), (-1, 0), (1, 0), (3, 0)

Zeros: x = -5, -1, 1, 3

End behavior: Left is rising

Right is rising



Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

Intervals of increase: $(-\infty, -2.5)$ $(1, \infty)$

Intervals of decrease: $(-2.5, 1)$

Absolute Max: NONE

Absolute Min: NONE

Relative Max: (-2.5, 1)

Relative Min: (1, -13)

Y-intercept: (0, -12)

X-intercept: (-3, 0), (-2, 0), (2, 0)

Zeros: x = -3, -2, 2

End behavior: Left is falling

Right is rising