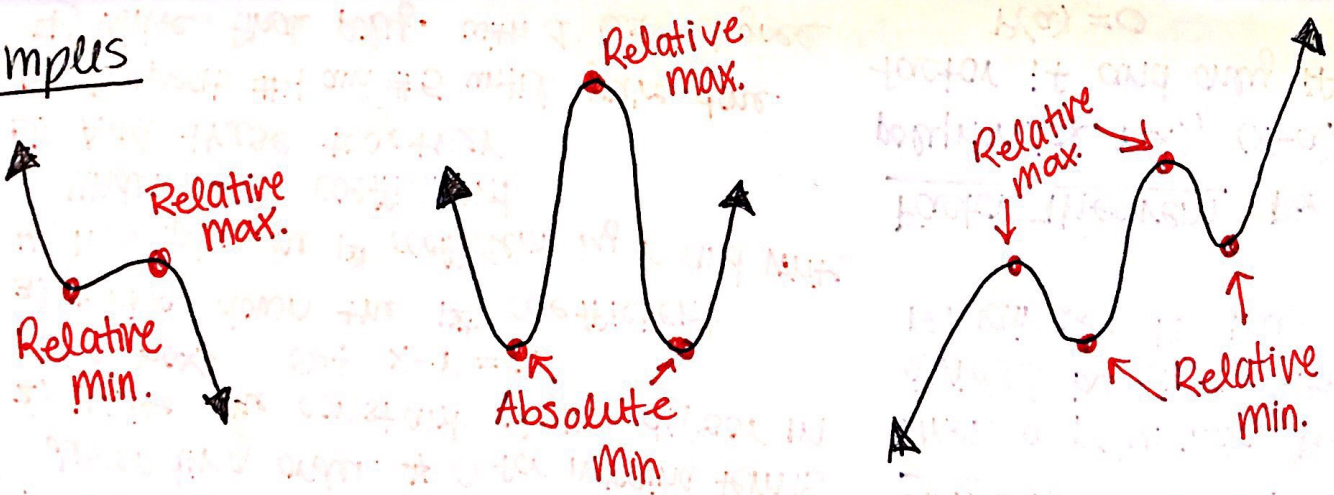


Extrema: high and low points on a graph

- Absolute Extrema - the highest/lowest point on a graph
⇒ Absolute maximum / Absolute minimum
- Relative Extrema - points higher/lower than others nearby
⇒ Relative maximum / Relative minimum

Examples



Extrema

Synthetic Division

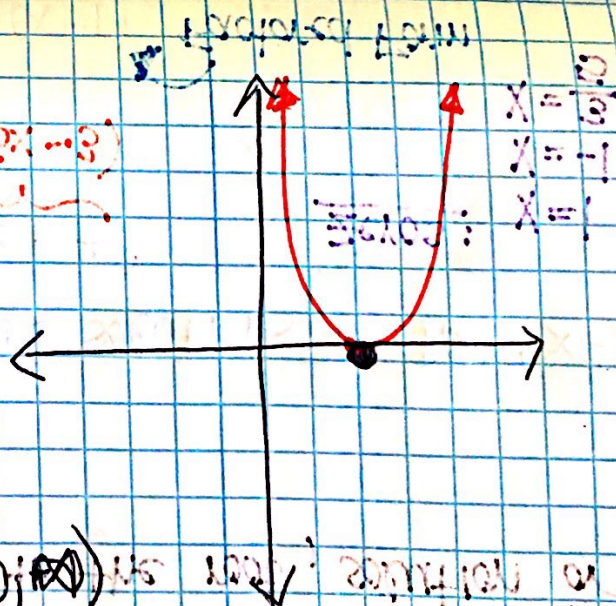
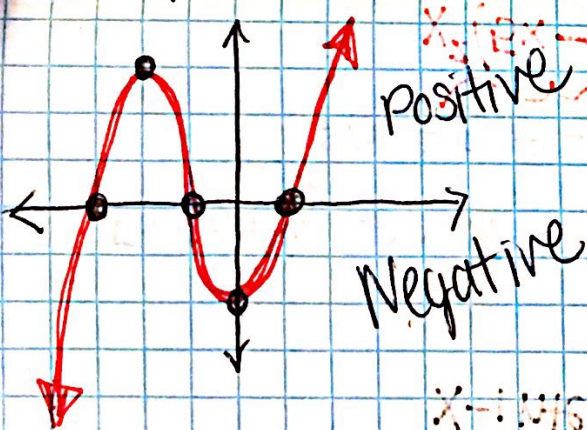
Increasing Interval: where the x-values are increasing } Think Slope!

Decreasing Interval: where the x-values are decreasing }

Positive Interval: where the y-values are positive } Above or Below x-axis

Negative Interval: where the y-values are negative }

Examples



Increasing: $(-N, -2)$ and $(0, N)$

Decreasing: $(-2, 0)$

Increasing: $(2, N)$

Decreasing: $(-N, 2)$

Increasing / Decreasing

Positive / Negative

End Behavior - what the graph does at each end

* To find ~~end~~ end behavior, look at the sign (+ or -) of the leading coefficient and the degree.

Leading Coefficient

Positive

Negative

	Odd	$y \rightarrow -\infty$ $x \rightarrow -\infty$	and	$y \rightarrow \infty$ $x \rightarrow \infty$
	Even	$y \rightarrow \infty$ $x \rightarrow -\infty$	and	$y \rightarrow \infty$ $x \rightarrow \infty$
		$y \rightarrow -\infty$ $x \rightarrow -\infty$	and	$y \rightarrow -\infty$ $x \rightarrow \infty$

degree

End Behavior

GUIDED NOTES: Graphs of Polynomials

EX1. $f(x) = 5x^3 - x^2 - 5x + 1$		
Factored Equation: $f(x) = (x-1)(5x-1)(x+1)$		
Zeroes (with multiplicity): $x=1$; mult. 1 $x=-1$; mult. 1 $x=\frac{1}{5}$; mult. 1	Intervals for Positive/Negative:	
Extrema: Rel. min @ $(0.65, -1.30)$ Rel. Max @ $(-0.51, 2.63)$	Intervals for Increasing/Decreasing: I: $(-\infty, -0.51)$ and $(0.65, \infty)$ D: $(-0.51, 0.65)$	
End Behavior: $y \rightarrow -\infty, x \rightarrow -\infty$ $y \rightarrow \infty, x \rightarrow \infty$		Y-intercept: $(0, 1)$

EX2. $f(x) = 3x^4 - 6x^2 + 3$		
Factored Equation: $f(x) = 3(x-1)^2(x+1)^2$		
Zeroes (with multiplicity):	Intervals for Positive/Negative:	
Extrema:	Intervals for Increasing/Decreasing:	
End Behavior:		Y-intercept: