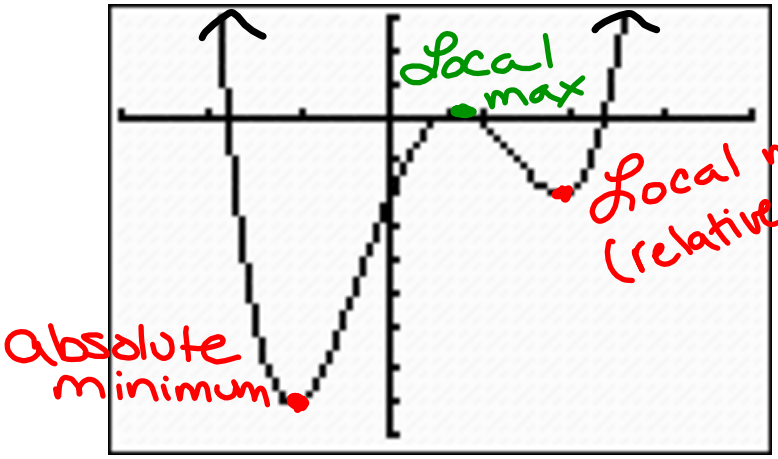
Local Max / Min (in terms of y)
Increasing / Decreasing (in terms of x)



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

Max 0.29
Min -8.1
-2.12

Turning Points

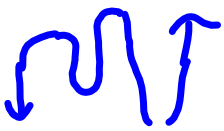
A polynomial function of degree *n* has at most *n-1* turning points.

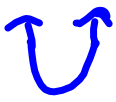
Max # of turns

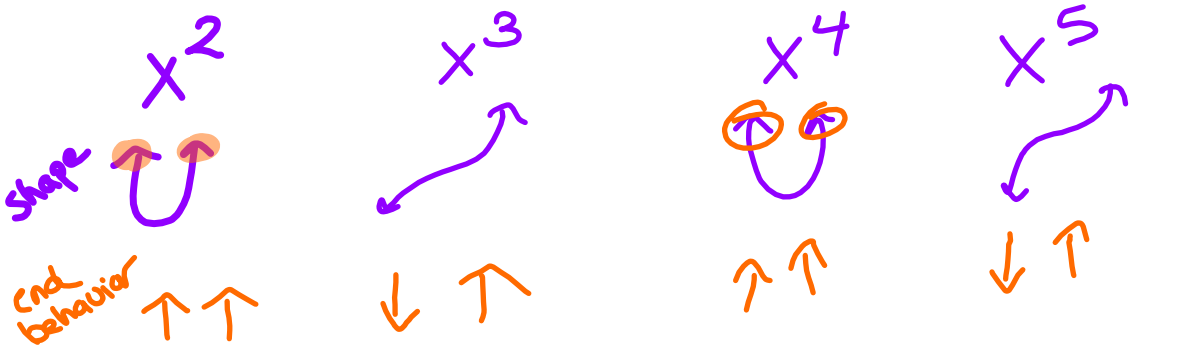
4 1. $f(x) = 3x^5 - 4x^3 + 3x^2 + 2$

3 2. $f(x) = x^3 - 3x^4 + 2x^2 - 1$

1 3. $y = x^2 + 2x + 3$







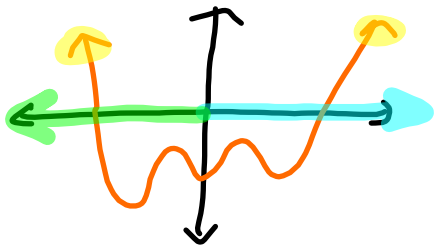
end behavior describes what y is doing

End Behavior of Graphs

"approaches" or "goes to"

$f(x) \to$ ∞ as $x \to +\infty$

$f(x) \to$ ∞ as $x \to -\infty$



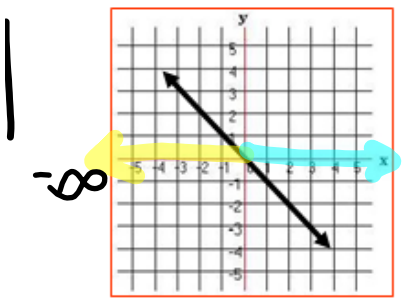
what does y do as x gets bigger and smaller

End Behavior of Graphs

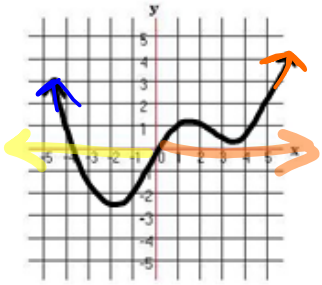
$f(x) \rightarrow$ _____ $as\ x \rightarrow +\infty$

$f(x) \rightarrow$ _____ $as\ x \rightarrow -\infty$

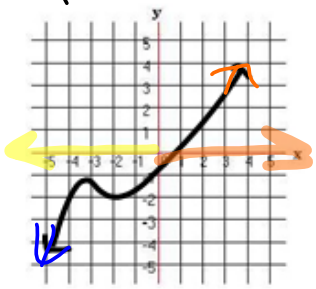
$f(x) \rightarrow -\infty$, as $x \rightarrow \infty$
$f(x) \rightarrow \infty$, as $x \rightarrow -\infty$



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

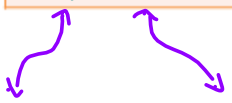


$f(x) \rightarrow \infty$ as $x \rightarrow \infty$
$f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$



End Behavior of Graphs

	+Lead Coefficient	-Lead Coefficient
Even Degree $x^2, x^4, x^6 \ldots$	$f(x) \to \infty$, $x \to \infty$ $f(x) \to \infty$, $x \to -\infty$	$f(x) \to -\infty$, $x \to \infty$ $f(x) \to -\infty$, $x \to -\infty$
Odd Degree $x^3, x^5, x^7 \ldots$	$f(x) \to \infty$ $x \to \infty$ $f(x) \to -\infty$ $x \to -\infty$	$f(x) \to -\infty$, $x \to \infty$ $f(x) \to \infty$ $x \to -\infty$



Graphs of Polynomial Functions

- Quadratic: $f(x) = x^2 - 2x$

D: $(-\infty, \infty)$ y-int 0

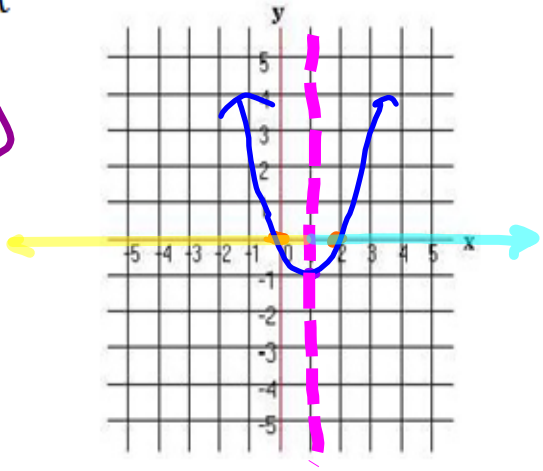
$0^2 - 2(0)$

R: $[-1, \infty)$

Zeros: $0, 2$

Inc: $(1, \infty)$

Dec: $(-\infty, 1)$



as $x \to \infty, f(x) \to \infty$

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

Graphs of Polynomial Functions

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

D: $(-\infty, \infty)$ y-int 0

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

Zeros: $-1, 0$

Inc: $(-\infty, -0.67) \cup (0, \infty)$

Dec: $(-0.67, 0)$

as $x \to \infty, f(x) \to \infty$

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