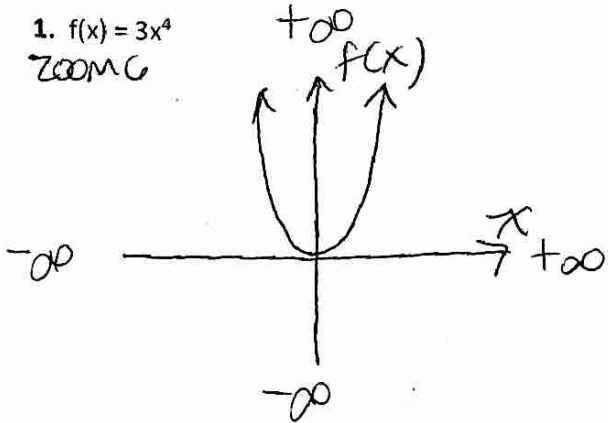


Day 03 Investigating End Behavior

Graph each of the following functions on a graphics calculator and quickly SKETCH the graph. Then fill in the blanks to describe the behavior on the "ends" of each graph.

1. $f(x) = 3x^4$
ZOOM 6



End Behavior:

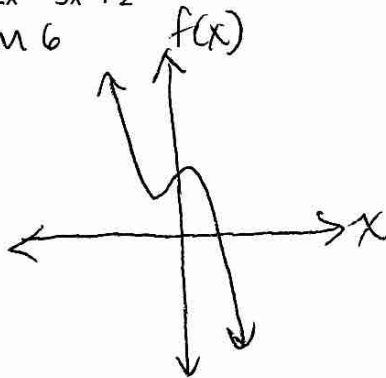
As $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$

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

positive a: starts & ends in $+\infty$

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

ZOOM 6



Behavior:

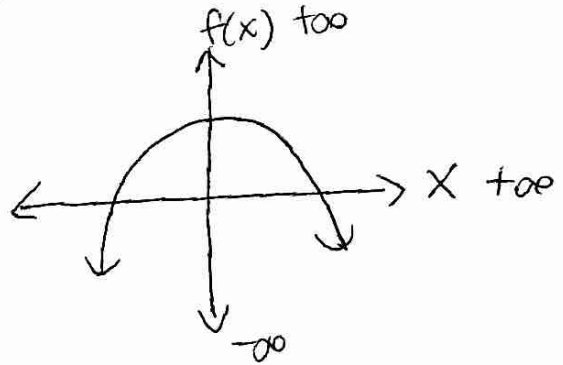
As $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$

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

negative a: starts in $+\infty$ & ends in $-\infty$

2. $y = 250 - 16x^2$

WINDOW: $[-10, 10, 1, -40, 500]$



End Behavior:

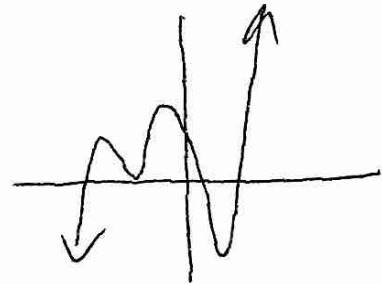
As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$

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

negative a: starts & ends in $-\infty$

4. $y = x^5 + 6x^4 + 9x^3 - 4x^2 - 12x$

ZOOM 6



Behavior:

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

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

positive a: starts in $-\infty$ & ends in $+\infty$

Compare the four graphs and the behavior of each function at its "ends". Describe how you could predict the end behavior of a function without graphing it?

- even degree will create both ends being $+\infty$ or both being $-\infty$, which means they will go in the same direction
- odd degree will create ends going in opposite directions one to $+\infty$ & one to $-\infty$

Increasing or Decreasing?

Name Master E
 Date _____ Block _____
 Unit 3, Day 4 CW

Graph each function using a graphing calculator and complete the following. Adjust the viewing window as necessary.

↳ or desmos

1. $f(x) = 2x^3 + 5x^2 - 18x - 15$

Identify the coordinates of the extrema.

Local maximum: $(-2.76, 30.72)$

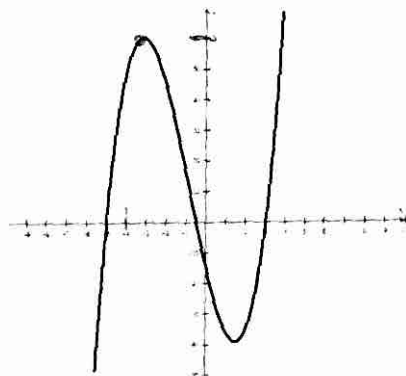
Local minimum: $(1.09, -26.09)$

In which intervals is the function increasing?

$(-\infty, -2.76), (1.09, \infty)$

In which intervals is the function decreasing?

$(-2.76, 1.09)$



Window $-5, 5, -30, 35$

2. $f(x) = x^4 - 2x^3 - 13x^2 + 14x + 24$

Identify the coordinates of the extrema.

Local maximum: $(0.5, 27.56)$

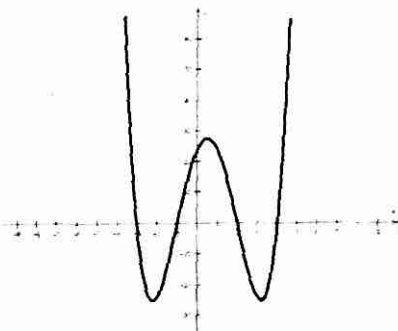
Local minimum: $(-2.19, -25), (3.19, -25)$

In which intervals is the function increasing?

$(-2.19, 0.5), (3.19, \infty)$

In which intervals is the function decreasing?

$(-\infty, -2.19), (0.5, 3.19)$



same as above

3. $f(x) = -2x^5 - 5x^4 + 24x^3 + 41x^2 - 34x - 24$

Identify the coordinates of the extrema.

Local maximum: $(-1.33, 29.96), (2.33, 138.24)$

Local minimum: $(-3.33, -138.24), (0.34, -29.96)$

In which intervals is the function increasing?

$(-3.33, -1.33), (0.34, 2.33)$

In which intervals is the function decreasing?

$(-\infty, -3.33), (-1.33, 0.34), (2.33, \infty)$

$-5, 5, -150, 150$

