

2.3 End Behavior and Average Rate of Change

End Behavior

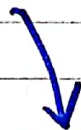
What are the ends of a graph doing?
How are they acting?

They could be going to infinity or negative infinity or getting close to an asymptote.

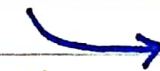
infinity



negative
infinity



close to an
asymptote



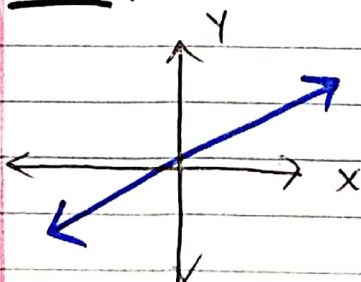
"leveling off"

Notation:

As $x \rightarrow -\infty$, $y \rightarrow$ _____ (left end)

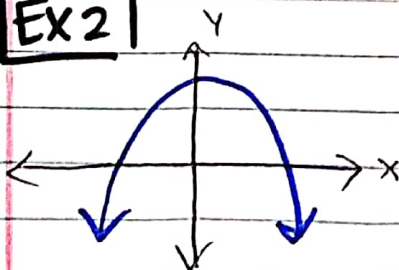
As $x \rightarrow \infty$, $y \rightarrow$ _____ (right end)

EX 1



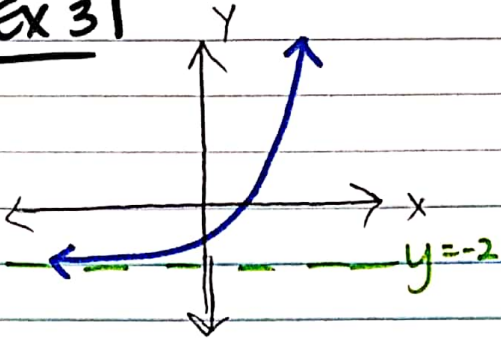
As $x \rightarrow -\infty$, $y \rightarrow -\infty$
As $x \rightarrow \infty$, $y \rightarrow \infty$

EX 2



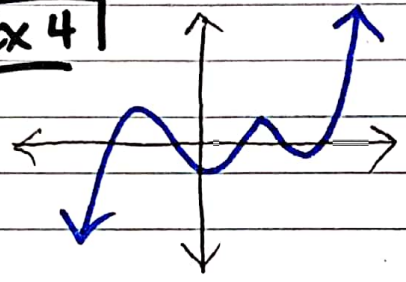
As $x \rightarrow -\infty$, $y \rightarrow -\infty$
As $x \rightarrow \infty$, $y \rightarrow -\infty$

Ex 3



As $x \rightarrow -\infty, y \rightarrow -2$
 As $x \rightarrow \infty, y \rightarrow \infty$

Ex 4

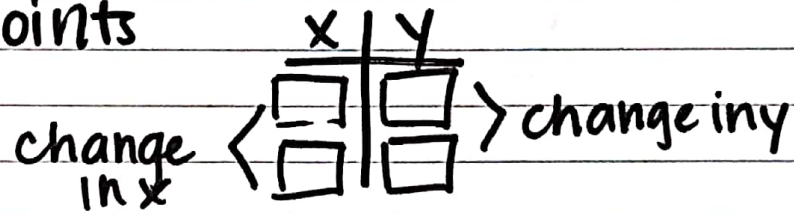


As $x \rightarrow -\infty, y \rightarrow -\infty$
 As $x \rightarrow \infty, y \rightarrow \infty$

Average Rate of Change

slope formula : $m = \frac{y_2 - y_1}{x_2 - x_1}$

two points



$\frac{\text{change in } y}{\text{change in } x}$

EX

Find the average rate of change between $(-1, 2)$ and $(5, 3)$

$+6 \left\langle \begin{array}{c|c} x & y \\ \hline -1 & 2 \\ 5 & 3 \end{array} \right\rangle +1$

$\boxed{\text{AROC} = \frac{1}{6}}$

Practice

Name: _____ Date: _____ Period: _____

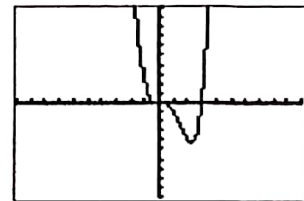
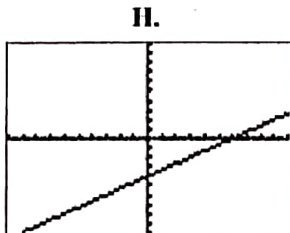
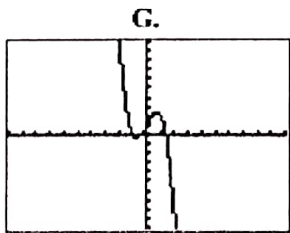
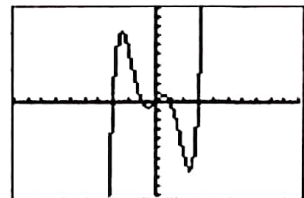
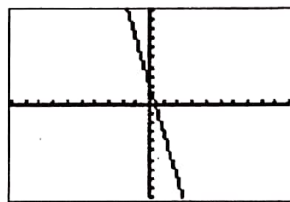
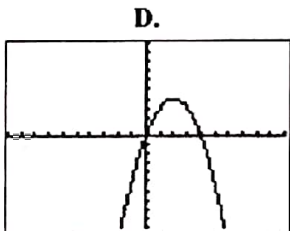
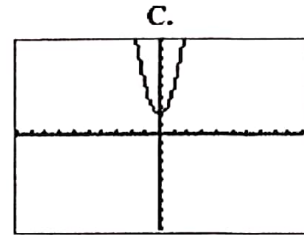
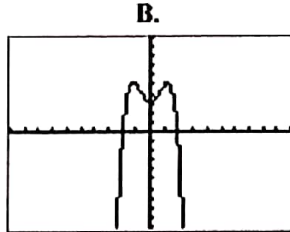
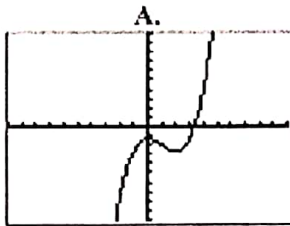
End Behavior

For the functions below, match them to their graphs using a graphing calculator. Then describe the end behavior of each graph.

Remember to start off:

As $x \rightarrow -\infty$, $y \rightarrow$ _____

As $x \rightarrow \infty$, $y \rightarrow$ _____



D 7] $y = -x^2 + 4x$

G 8] $y = -2x^3 + 3x + 1$

A 9] $y = \frac{1}{3}x^3 - x^2 - \frac{4}{3}$

B 10] $y = -x^4 + 3x^2 + 3$

C 11] $y = 3x^2 + 2$

H 12] $y = \frac{2}{3}x - 4$

I 13] $y = \frac{1}{2}x^4 - \frac{3}{2}x^3$

F 14] $y = \frac{1}{5}x^5 - 2x^3 + \frac{9}{5}x$

E 15] $y = -5x + 2$

7] As $x \rightarrow -\infty$, $y \rightarrow -\infty$ As $x \rightarrow \infty$, $y \rightarrow -\infty$	8]	9]
10]	11]	12]
13]	14]	15]