

Calculus BC

Section 1.2 - Finding Limits Graphically and Numerically

Obj: -Estimate a limit using a numerical or graphical approach
- Learn different ways that a limit can fail to exist

1. Find $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x - 2}$ by

a) constructing a table

x	1.75	1.9	1.99	1.99	2	2.001	2.01	2.1	2.25
$f(x)$									

b) drawing a graph

-before graphing, try to simplify function
-note that the simplified version is not the exact equivalence. Why not?

Finding a Limit:

Right hand limit : $\lim_{x \rightarrow c^+} f(x)$

- the limit of $f(x)$ as x approaches c from the right

Left hand limit : $\lim_{x \rightarrow c^-} f(x)$

- the limit of $f(x)$ as x approaches c from the left

2. Find the following limits for the given graph of $f(x)$

• $\lim_{x \rightarrow 2^-} f(x) =$

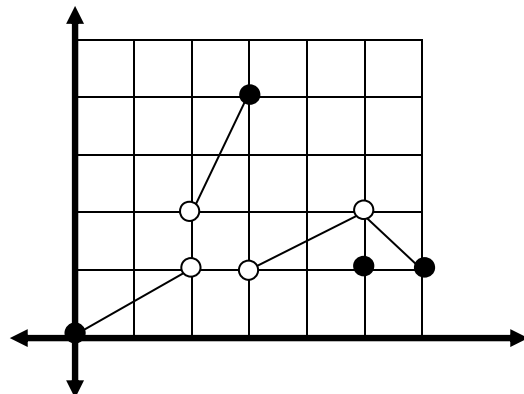
• $\lim_{x \rightarrow 5^-} f(x) =$

• $\lim_{x \rightarrow 2^+} f(x) =$

• $\lim_{x \rightarrow 5^+} f(x) =$

• $\lim_{x \rightarrow 3^-} f(x) =$

• $\lim_{x \rightarrow 3^+} f(x) =$



For $\lim_{x \rightarrow c} f(x)$ to exist, it must equal to both

$$\lim_{x \rightarrow c^+} f(x) \quad \text{and} \quad \lim_{x \rightarrow c^-} f(x)$$

3. Using problem 2 above, find

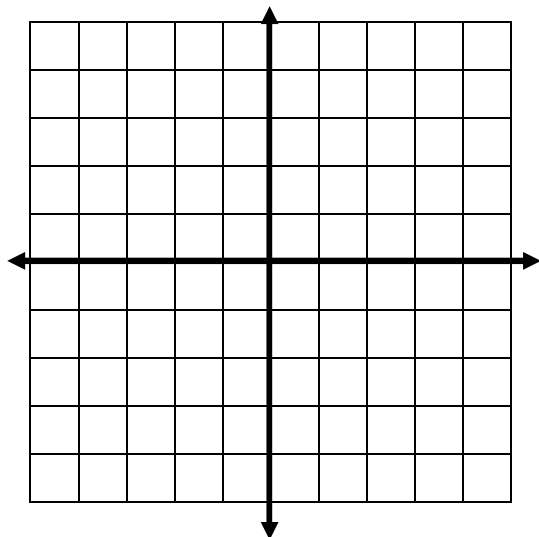
a) $\lim_{x \rightarrow 2} f(x)$

b) $\lim_{x \rightarrow 3} f(x)$

c) $\lim_{x \rightarrow 5} f(x)$

d) at what other points c does $\lim_{x \rightarrow c} f(x)$ exist?

4. Graph the piecewise function



$$f(x) = \begin{cases} x & \text{for } x < 0 \\ x^2 & \text{for } 0 \leq x \leq 2 \\ 4 & \text{for } x > 2 \end{cases}$$

5. Graph $f(x) = \sin \frac{1}{x}$ and examine $\lim_{x \rightarrow 0} \sin \frac{1}{x}$