

AP Calculus BC
Lesson 2.2 Openers

1. Find $\lim_{x \rightarrow 1.5} \frac{2x^2 + x - 6}{2x^2 - 13x + 15}$

2. Using the graph of $y = f(x)$ at right, find each of the following:

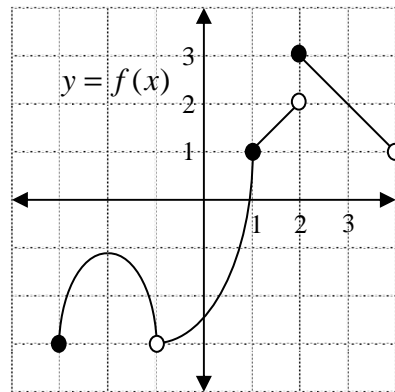
a) $\lim_{x \rightarrow 1} f(x)$

b) $\lim_{x \rightarrow -1} f(x)$

c) $\lim_{x \rightarrow 2^+} f(x)$

d) $\lim_{x \rightarrow 2^-} f(x)$

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



3. What do the following statements say about a function $f(x)$?

a) $\lim_{x \rightarrow 2^+} f(x) = \infty$ and $\lim_{x \rightarrow 2^-} f(x) = -\infty$

b) $\lim_{x \rightarrow 2} f(x) = \infty$

c) $\lim_{x \rightarrow \infty} f(x) = 3$

d) $\lim_{x \rightarrow \infty} f(x) = -\infty$

4. a) Set your calculator in degree mode. Find $\lim_{x \rightarrow 0} \frac{\sin(x)}{x}$.

b) Set your calculator in radian mode. Find $\lim_{x \rightarrow 0} \frac{\sin(x)}{x}$.

c) Explain the discrepancy in your answers.

5. Evaluate each of the following limits (try TI-89 AND analytical).

a) $\lim_{x \rightarrow 4} \frac{3x^2 - 8x - 16}{2x^2 - 9x + 4}$

b) $\lim_{x \rightarrow -1} \frac{\sqrt{x+5} - 2}{x+1}$

c) $\lim_{h \rightarrow 0} \frac{(x+h)^3 - x^3}{h}$

d) $\lim_{h \rightarrow 0} \frac{\sqrt[3]{h+1} - 1}{h}$

e) $\lim_{x \rightarrow 0^+} (1+x)^{1/x}$

6. Evaluate each limit.

a) $\lim_{x \rightarrow -2} \sqrt{x-2}$

b) $\lim_{x \rightarrow 0} \frac{|x|}{x}$

c) $\lim_{x \rightarrow 0} \frac{1}{x^2}$

d) $\lim_{x \rightarrow 0} \frac{(3+x)^2 - 9}{x}$

7. Let $f(x) = \begin{cases} 3-x, & x < 2 \\ 2, & x = 2 \\ \frac{x}{2}, & x > 2 \end{cases}$

a) Draw a complete graph of $f(x)$

b) Find $\lim_{x \rightarrow 2^+} f(x)$ and $\lim_{x \rightarrow 2^-} f(x)$.

c) Does $\lim_{x \rightarrow 2} f(x)$ exist? If so, what is it? If not, why not?

8. a) Draw the graph of $y = 0$.

b) Draw the graph of $y = \left| x \sin \frac{1}{x} \right|$.

c) Draw the graph of $y = |x|$.

d) Find $\lim_{x \rightarrow 0} \left| x \sin \frac{1}{x} \right|$. Explain your reasoning.