

Limits & Continuity
Chapter 1 Review II
OPTIONAL

Find the following limits *without* using a graphing calculator or making tables.

#1) $\lim_{x \rightarrow 7} \frac{x^2 - x}{2x - 7}$

#2) $\lim_{s \rightarrow 4} (s^{\frac{3}{2}} - 3s^{\frac{1}{2}})$

#3) $\lim_{x \rightarrow 0} \frac{x^2 - x}{x^2 + x}$

#4) $\lim_{h \rightarrow 0} \frac{5x^4h - 9xh^2}{h}$

Answer each question concerning piecewise functions.

#5) $f(x) = \begin{cases} 5 - x, & \text{if } x < 4 \\ 2x - 5, & \text{if } x \geq 4 \end{cases}$

a. $\lim_{x \rightarrow 4^-} f(x) =$

b. $\lim_{x \rightarrow 4^+} f(x) =$

c. $\lim_{x \rightarrow 4} f(x) =$

#6) $f(x) = \begin{cases} 2 - x, & \text{if } x < 4 \\ 2x - 10, & \text{if } x \geq 4 \end{cases}$

a. $\lim_{x \rightarrow 4^-} f(x) =$

b. $\lim_{x \rightarrow 4^+} f(x) =$

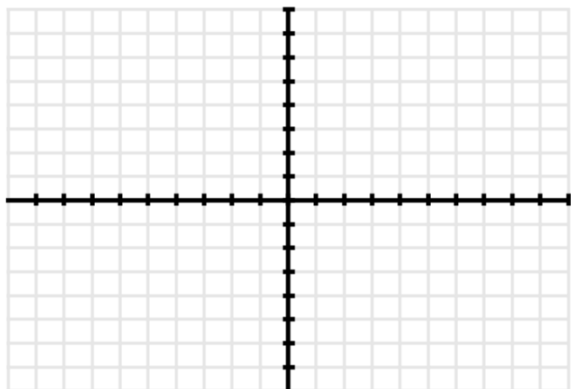
c. $\lim_{x \rightarrow 4} f(x) =$

Limits & Continuity
Chapter 1 Review II
OPTIONAL

#7) For the following piecewise function:

$$f(x) = \begin{cases} 5 - x, & \text{if } x \leq 3 \\ x - 2, & \text{if } x > 3 \end{cases}$$

a. Draw its graph



b. Find the limits as x approaches 3 from the left.

c. Find the limits as x approaches 3 from the right.

d. Is it continuous at $x = 3$? If not, why?

Find $f'(x)$ by using the definition of the derivative.

#8) $f(x) = 2x^2 - 5x + 1$

#9) $f(x) = -3x + 5$

Limits & Continuity

Chapter 1 Review II

OPTIONAL

Find $\frac{d}{dx}f(x)$ by using the definition of the derivative.

#10) $f(x) = \frac{1}{2x}$

#11) Find the equation for the tangent line to the curve $f(x) = 2x^2 - 5x + 1$ at $x = 2$. Write your equation in slope-intercept form. (Use a graphing calculator to graph the curve with the tangent line to verify your answer.)

#12) Find the equation for the tangent line to the curve $f(x) = 3x^2 - 8x + 7$ at $x = 3$. Write your equation in slope-intercept form. (Use a graphing calculator to graph the curve with the tangent line to verify your answer.)

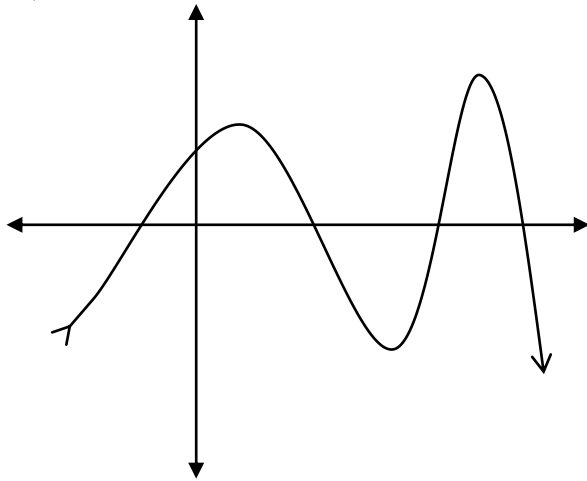
Limits & Continuity

Chapter 1 Review II

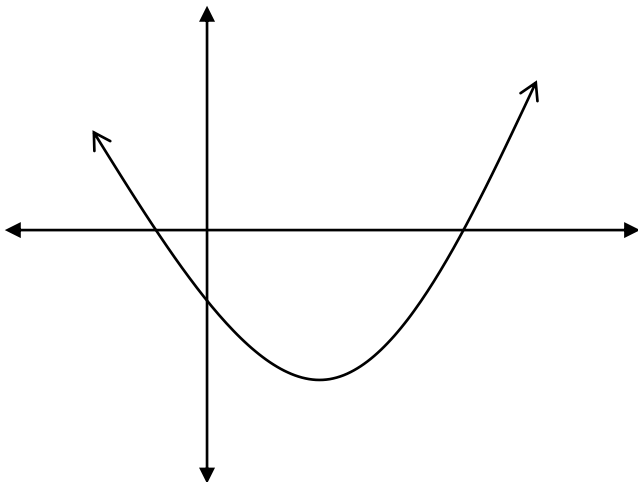
OPTIONAL

Given the graph of a function, sketch in the graph of its derivative function.

#13)



#14)



#15) Often times, problems will ask for the derivative without using the word “derivative”. We have learned two interpretations of a derivative. What are these two interpretations?

#16) $\lim_{x \rightarrow 5} (x^2 + 1) = 26$ is read as x approaches 5 of $x^2 + 1$ is equal to 26. Use sentences and graphs to illustrate the meaning of said statement.

#17) Give 2 specific scenarios of when a limit would not exist and explain why. You *may* use graphs to illustrate your point.

Scenario #1:

Scenario #2: