

Lesson 8: Assignment Unit 1

**KU: Getting Ready for the Test**

1. Which of the following is not a condition for the existence of a limit of  $f(x)$  at  $x = 3$ .
- A) the left limit as  $x \rightarrow 3$  exists.                      C)  $f(3)$  exists.  
B)  $\lim_{x \rightarrow 3^+} f(x)$  exists                                      D) the left and right limits are equal.

2. Fill in the blank to make the function continuous.  $f(x) = \begin{cases} x^2 - 7x - 30 & x \neq 10 \\ \underline{\hspace{2cm}} & x = 10 \end{cases}$
- A) 3                      B) -13                      C) 13                      D) -3

3. The function  $f(x) = \begin{cases} y = x + 6 & x \leq -2 \\ x^2 & -2 < x < 2 \\ x - 6 & x \geq 2 \end{cases}$  is discontinuous at  $x =$  :
- A) -2, 2                      B) 2 only                      C) -2 only                      D) Nowhere

4. The graph of  $y = x - 3$ ,  $x \neq 3$  is identical to

- A)  $y = x - 3$     B)  $y = x - 3$  & the point (3, 0)    C)  $y = \frac{(x-3)^2}{x-3}$     D)  $y = \frac{(x^2-9)}{x-3}$

5. Given  $\lim_{x \rightarrow 5} f(x) = 2$  and  $\lim_{x \rightarrow 5} g(x) = -5$  then

- A)  $\lim_{x \rightarrow 25} (g(x) \cdot f(x)) = -10$     B)  $\lim_{x \rightarrow 10} (g(x) \cdot f(x)) = -10$     C)  $\lim_{x \rightarrow 5} (g(x) \cdot f(x)) = -10$

6. Why is  $\lim_{x \rightarrow 0} 4\sqrt{x} = 0$  an incorrect statement? Be specific.

7. Evaluate. A)  $\lim_{x \rightarrow 0} \frac{x}{\sqrt{3+4x} - \sqrt{6x+3}}$                       B)  $\lim_{x \rightarrow 1} \left( \frac{2}{x-1} \right) \left( \frac{1}{x+3} - \frac{2}{3x+5} \right)$

8. Use limits to determine the slope of the tangent to  $y = 5 - 3x^2$  at  $x = 1$ .

9. Determine the slope of the tangent to  $y = \frac{2}{x}$  at  $x = 2$ .

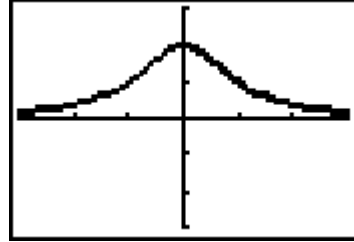
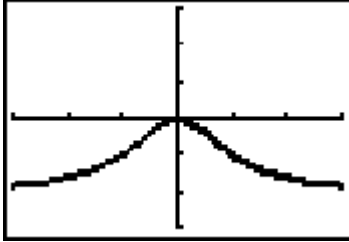
**APPS—Using Limits and Derivatives**

1. An object is launched from the surface of Venus. Its height, in m, is given in terms of the time,  $t$  in seconds, by  $H(t) = 10 + 90t - 4.5t^2$ . Use limits, to answer the following.
- a) What is the initial velocity of the object?  
b) What is the velocity of the rocket at 10s? What does this imply?  
c) What is the maximum height of the rocket?  
d) When does the object return to the ground?  
e) What is the average velocity of the entire flight?

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**COMM—Sketching and Discussing Rates of Change**

Two graphs are provided below. For each graph, sketch the rate of change graph. Compare the two rate of change graphs. Explain the significance.



**TIPS**

Below is are the graphs of  $y = x$ ,  $y = \sin(x)$ , and  $y = \sin(x) + x$ .

- a) **Sketch** the rate of change graphs for  $y = \sin(x)$  and  $y = x$ .
- b) **Explain** how these rate of change graphs could be used to predict the rate of change graph for the  $y = \sin(x) + x$ .
- c) **Sketch** the rate of change graph for  $y = \sin(x) + x$ .

