CALCULUS 12 LG 5/6 DERIVATIVE

INTRODUCTION:

The derivative is one of the two major components to this calculus course. It is very important to understand the concepts brought up in this learning guide.

LEARNING GUIDE EXPECTATIONS:

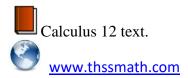
On the completion of this learning guide you will be able to:

- 1) describe geometrically a secant line and a tangent line for the graph of a function at x=a.
- 2) distinguish between average and instantaneous rate of change.
- 3) define and calculate the derivative at x=a using the definition of the derivative and other limit interpretations.
- 4) distinguish between continuity and differentiability of a function at a point.
- 5) determine the slope and equation of a tangent line to a curve at a point.
- 6) use the Sum, Product, Quotient and Power rule to calculate derivatives.
- 7) determine the derivative of elementary trig functions.
- 8) use the chain rule to compute the derivative of a composite function.
- 9) use the tangent line approximation to estimate values of a function near a point and analyze the approximation using the second derivative.

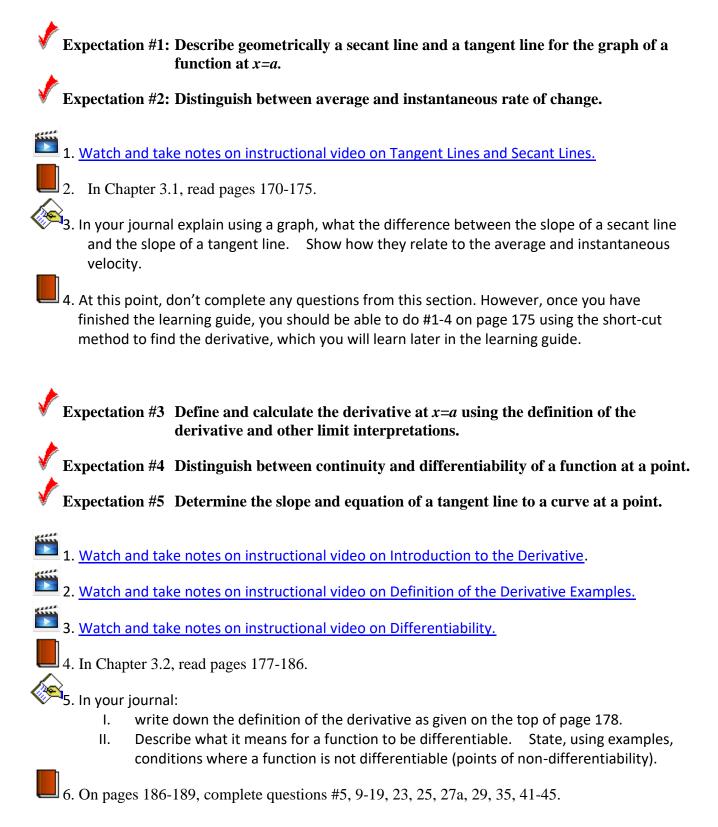


When you are ready, write the LG 5/6 quiz in the test centre.

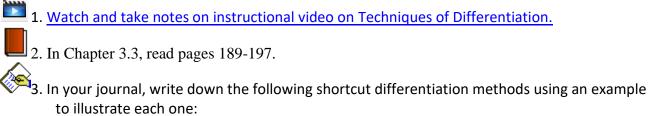
RESOURCES NEEDED:



LEARNING ACTIVITIES



Expectation #6 Use the Sum, Product, Quotient and Power rule to calculate derivatives.



- I. Power rule (page 190)
- II. Product rule (page 192)
- III. Quotient rule (page 193)

4. On pages 197-199 complete questions #1-35, 41, 43-47odd, 59, 69, 75-79odd.

Expectation #7 Determine the derivative of elementary trig functions.

1. <u>Watch and take notes on instructional video on Derivatives of Trig Functions.</u>

2. In Chapter 3.4, read pages 200-202.

¹3. In your journal, write down the derivatives of the following functions.

- I. $y = \sin x$
- II. $y = \cos x$
- III. $y = \tan x$
- IV. $y = \csc x$
- V. $y = \sec x$ VI. $y = \cot x$
- $y = \cot x$

4. On pages 202-203, complete questions #1-24, 27, 31, 32.

Expectation #8 Use the chain rule to compute the derivative of a composite function.

1. Watch and take notes on instructional video on Chain Rule.

2. In chapter 3.5, read pages 204-208.

- 3. In your journal, using an example, describe how you would use the chain rule to calculate a derivative.
- 4. On pages 208-210, complete #1-49, 55a, 61.

Expectation #9 Use the tangent line approximation to estimate values of a function near a point and analyze the approximation using the second derivative.

1. Watch and take notes on instructional video on Local Linear Approximation.

2. In chapter 3.6, read pages 210-216 with emphasis on the local linear approximation section

from pages 212-214.

3. In your journal, using an example, describe how you can use the equation of the tangent line to estimate y-values of other functions.

4. On page 217, complete questions #17-20, 27-35.