CALCULUS 12 LG 2/3

LIMITS AND CONTINUITY

INTRODUCTION:

The concept of the limit is the fundamental building block on which all other calculus concepts are based.

LEARNING GUIDE EXPECTATIONS:

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

1) demonstrate an understanding of the concept of limits and notation used in expressing the limit of a function.
2) distinguish between the limit of a function as x approaches a and the value of the function at $x = a$.
3) determine the limits that result in infinity.
4) demonstrate an understanding of 1-sided limits and evaluate them.
5) determine vertical and horizontal asymptotes of a function using limits.
6) evaluate the limit of a function: analytically, graphically, and numerically.
7) evaluate limits of functions as x approaches infinity.
8) determine whether a function is continuous at x=a.
9) determine limits and continuity of trig functions.

EVALUATION:

Write the LG 2-3 quiz.

RESOURCES NEEDED:

Calculus 12 text.

sd42onlinemath.yolasite.com

LEARNING ACTIVITIES

Expectation #1: Demonstrate an understanding of the concept of limits and notation used in expressing the limit of a function.

Expectation #2: Distinguish between the limit of a function as *x* approaches *a* and the value of the function at *x* = *a*.

Expectation #3: Determine the limits that result in infinity.

Expectation #4: Demonstrate an understanding of 1-sided limits and evaluate them.

Expectation #5: Determine vertical and horizontal asymptotes of a function using limits.

1. Watch and take notes on instructional video on Introduction to Limits.
2. Read pages 112-124.
3. In your journal:
   i. define what a limit is.
   ii. What is the difference between a 2-sided limit and a 1-sided limit and what is the relationship between them?
   iii. What is the relationship between an infinite limit and a vertical asymptote?
   iv. What is the relationship between limits at infinity and a horizontal asymptote?
4. Do pages 124-126
   #1-16

Expectation #6: Evaluate the limit of a function: analytically, graphically, and numerically.

Expectation #7: Evaluate limits of functions as *x* approaches infinity.

1. Watch and take notes on instructional video on Computing Limits.
2. Read pages 127-136.

3. In your journal, explain using examples, how you would calculate the limits of:
   i. Polynomial functions as x approaches a.
   ii. Polynomial functions as x approaches ±∞.
   iii. Rational functions as x approaches a.
   iv. Rational functions as x approaches ±∞.
   v. Radical functions.
   vi. Piecewise functions.

4. Do pages 137-138
   #1, 2, 5-9, 11-50, 52-60.

Expectation #8: Determine whether a function is continuous at *x*=a.

1. Watch and take notes on instructional video on Continuity.

2. Read pages 148-156.

3. In your journal:
   i. define what it means for a function to be continuous at a point c.
   ii. explain, using an example, the Intermediate Value Theorem.

4. Do pages 156-158
   #1-4, 7, 11-23, 25, 27, 28b,c, 41.

Expectation #9: Determine limits and continuity of trig functions.

1. Watch and take notes on instructional video on Limits and Continuity of Trig Functions.

2. Read pages 159-162.

3. In your journal, add the 2 theorems at the bottom of page 160.

4. Do pages 163-164
   #1-10, 13-35, 37, 39.

Once you feel you are ready for the LG 2-3 quiz, complete the LG 2-3 Assessment Quiz on the website under "Assessment Quizzes" and then email your marked LG 2-3 quiz to your teacher along with any questions you may have. Please email your quiz as a pdf combined into 1 file and attach it to an email. You may email either version A or version B of the LG assessment quizzes.