

CALCULUS 12 LG 17-18

APPLICATIONS OF INTEGRATION



INTRODUCTION:

In this learning guide, you will learn to find area between 2 curves as well as volumes of revolutions. In addition, you will learn to solve equations with derivatives in it.



LEARNING GUIDE EXPECTATIONS:

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

- 1) Find the area between two curves.
- 2) Find the volume with cross sections and volume when revolved around an axis.
- 3) Use differentiation to determine whether a given function or family of functions is a solution of a given differential equation.
- 4) Model and solve exponential growth and decay problems using differential equations of the form $\frac{dy}{dt} = ky$ and problems involving Newton's Law of Cooling using a differential of the form $\frac{dy}{dt} = ay + b$.



EVALUATION:

When you are ready, write the LG 17-18 quiz in the test centre.



RESOURCES NEEDED:



Calculus 12 text.



www.thssmath.com

LEARNING ACTIVITIES



Expectation #1: Find the area between 2 curves.



1. [Watch and take notes on instructional video on Area Between 2 Curves.](#)



2. In Chapter 8.1, read pages 462-466.



3. In your journal, describe, using an example, how to find the area between 2 curves.



4. On page 467, complete questions #1-16, 25, 26.



Expectation #2: Find the volume with cross sections and volume when revolved around an axis.



1. [Watch and take notes on instructional video on Volumes by slicing.](#)



2. [Watch and take notes on instructional video on Volumes by disks and washers.](#)



3. In Chapter 8.2, read pages 468-473.



4. In your journal, describe, using an example, how to find:
 a) the volume of an object with cross sections.
 b) the volume when a function is revolved around the x or y axis (disc method).
 c) the volume when a function is revolved around another function (washer method).



5. On page 473-474, complete questions #1-13, 15-22, 24, 27, 29, 33, 34, 35.



Expectation #3: Use differentiation to determine whether a given function or family of functions is a solution of a given differential equation.



1. [Watch and take notes on instructional video on Differential Equations.](#)



2. In Chapter 10.1, read pages 580-583.



3. In your journal, describe, using an example, how you can solve a first order separable differential equation.



4. On page 589, complete questions #1-4, 7-8 (only solve by method of separation of variables), 9-18.



Expectation #4: Model and solve exponential growth and decay problems using differential equations of the form $\frac{dy}{dt} = ky$ and problems involving Newton's Law of Cooling using a differential of the form $\frac{dy}{dt} = ay + b$.



1. [Watch and take notes on instructional video on Modeling Differential Equations.](#)



2. In Chapter 10.3, read pages 598-604.



3. In your journal, explain how we can use differential equations to model growth and decay.



4. On pages 609-611, complete questions #5-10, 13, 14, 29-31 (#31-Best question in the text!).