CALCULUS 12 LG 18

DIFFERENTIAL EQUATIONS

INTRODUCTION:

This learning guide will introduce you to how we can solve equations with derivatives in it. You will also learn how to model real world problems with differential equations.

LEARNING GUIDE EXPECTATIONS:

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

1) Use differentiation to determine whether a given function or family of functions is a solution of a given differential equation.
2) 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 18 quiz in the test centre.

RESOURCES NEEDED:

Calculus 12 text.

www.thssmath.com

LEARNING ACTIVITIES

Expectation #1: 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 #2: 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!).