MA104 Lesson 7

The Derivative as a Function

Thursday, 24 January, 2008

Outline

Admin

Last Class

The Derivative as a Function
- Course Guide
- The Derivative as a Function
  - Definitions
- An Example Problem
- Continuity and the derivative

Look Forward - Derivatives of Power, Exponential, and Log Functions
- Course Guide

Admin

1. DO PROBLEM INFO: In the right corner of page: Name, Section, Lesson #

Birthday Cadet

Who's Birthday is It?

Birthday Cadet

Who's Birthday is It?

1. This cadet is from a city in Virginia!

Birthday Cadet

Who's Birthday is It?

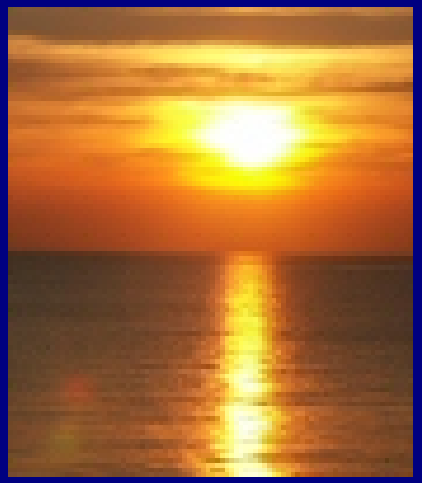
2.

Birthday Cadet

Who's Birthday is It?

3. Yes it is Poquoson, Virginia

Birthday Cadet

1. 

Birthday Cadet

2. This cadet is involved with the Mountaineering Team and the Theatre Arts Guild

Birthday Cadet

3.

Birthday Cadet

4. Stuart Vaughn is 19 today!

Derivatives and Rates of Change

Questions?

Outline

Admin

Last Class

The Derivative as a Function
- Course Guide
- The Derivative as a Function
  - Definitions
- An Example Problem
- Continuity and the derivative

Look Forward - Derivatives of Power, Exponential, and Log Functions
- Course Guide

Objectives

1. Know and understand the definition of the derivative and apply the definition to find derivatives of basic polynomial functions.
2. Understand when a function fails to be differentiable.
3. Understand the graphical, algebraic and physical interpretations of the derivative.

READ

1. Stewart: Section 2.8, pages 154-161.
2. Student Notes.

THINK ABOUT

1. Why do we have different notations for representing the derivative?

DO Problems

1. Section 2.8/ 17, 20, 21, 35, 38

Outline

Admin

Last Class

The Derivative as a Function
- Course Guide
- The Derivative as a Function
  - Definitions
- An Example Problem
- Continuity and the derivative

Look Forward - Derivatives of Power, Exponential, and Log Functions
- Course Guide

Definitions

1. Definition #4

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

Outline

Admin

Last Class

The Derivative as a Function
- Course Guide
- The Derivative as a Function
  - Definitions
- An Example Problem
- Continuity and the derivative

Look Forward - Derivatives of Power, Exponential, and Log Functions
- Course Guide

An Example Problem

1. $f(x) = x^2 - 4x + 7$ Find a formula for $f'(x)$
   1.1 use the definition of the derivative
   1.2 graph $f(x)$, and $f'(x)$ on the same graph and compare

Outline

Admin

Last Class

The Derivative as a Function
- Course Guide
- The Derivative as a Function
  - Definitions
- An Example Problem
- Continuity and the derivative

Look Forward - Derivatives of Power, Exponential, and Log Functions
- Course Guide

Continuity and the derivative

1. How does it tie together?

Continuity and the derivative

1. How does it tie together?
2. Continuity says that

$$\lim_{x \to a^-} f(x) = \lim_{x \to a^+} f(x)$$

Continuity and the derivative

1. How does it tie together?
2. Continuity says that

$$\lim_{x \to a^-} f(x) = \lim_{x \to a^+} f(x)$$

3. Smoothness says that

$$\lim_{x \to a^-} \frac{f(x) - f(a)}{x - a} = \lim_{x \to a^+} \frac{f(x) - f(a)}{x - a}$$

Outline

Admin

Last Class

The Derivative as a Function
- Course Guide
- The Derivative as a Function
  - Definitions
- An Example Problem
- Continuity and the derivative

Look Forward - Derivatives of Power, Exponential, and Log Functions
- Course Guide

Lesson 8 - Derivatives of Power, Exponential, and Log Functions

1. OBJECTIVES:
   - 1.1 Apply the Constant Multiple, Sum and Difference Rules to calculate derivatives of algebraic functions.
   - 1.2 Calculate the derivative of a power function using the Power Rule.
   - 1.3 Calculate the derivative of the natural exponential function.
   - 1.4 Calculate the derivative of the natural log function.
2. READ:
   - 2.1 Stewart: Section 3.1, pages 173-180.
   - 2.2 Stewart: Section 3.6, page 215 (Definition 2).
   - 2.3 Student Notes.
3. THINK ABOUT:
   - 3.1 What is unique about the natural exponential function?
4. DO:
   - 4.1 Section 3.1/ 3, 5, 7, 9, 11, 13, 15, 17, 19, 22, 32, 45

Questions?

Questions?