

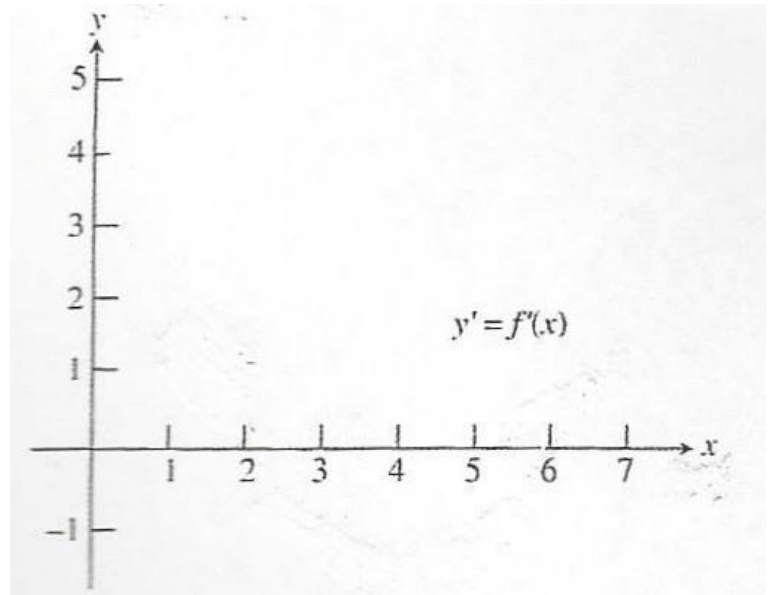
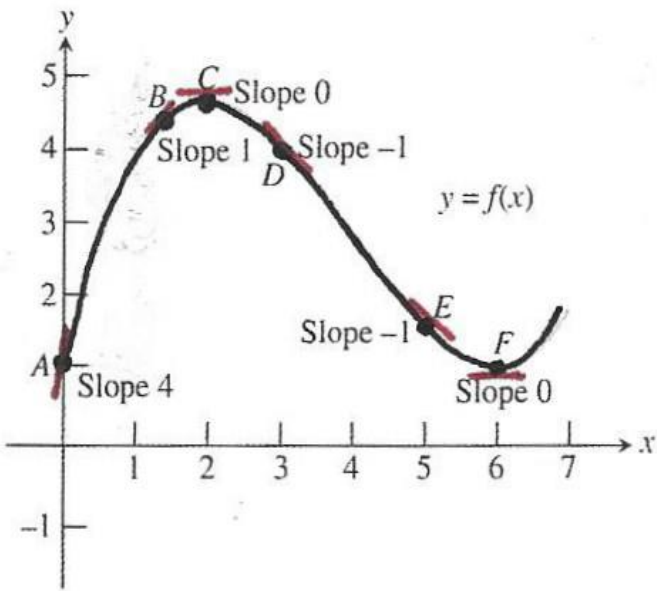
Unit #6: Continuity

Topic: Alternative Definition of a Derivative

Objective: *SWBAT find the derivative of a function by using the alternative definition of the derivative.*

Warm Up #5:

Graph the derivative of the function f whose graph is shown below. Discuss the behavior of f in terms of the signs and values of f' .



The Alternative Definition of the Derivative:

We can find the derivative of $f(x)$ at a point where $x = a$ by using an alternate definition for the derivative at a point



provided the limit exists.

Applying the Alternate Definition:

Example #1: Find $\frac{d}{dx}[5x^3 + 1]$ using the alternate definition.

What is the value of the derivative when $a = -1$?

What is the formula for the derivative as a function?

Example #2: Find y' if $y = \sqrt{2x}$ using the alternate definition.

What is the slope of the curve at $a = 5$?

Are there any values of a for which the derivative will not exist?

Problem Set #5: Find the derivative for each of the following at the indicated value of a using the alternate definition.

$$1) y = \sqrt{x+2} ; a = 7$$

$$2) f(x) = 2x + 3 ; a = -1$$

$$3) g(x) = -3x^2 ; a = \frac{3}{2}$$

$$4) y = \frac{1}{x+2} ; a = 4$$

$$5) f(x) = 3 - 4x^2 ; a = 3$$

$$6) y = x^3 + x ; a = -2$$

Answer Key: 1) $\frac{1}{6}$ 2) 2 3) -9 4) $-\frac{1}{36}$ 5) -24 6) 13

