

# Valencia College

Department of Mathematics

MAC 2233

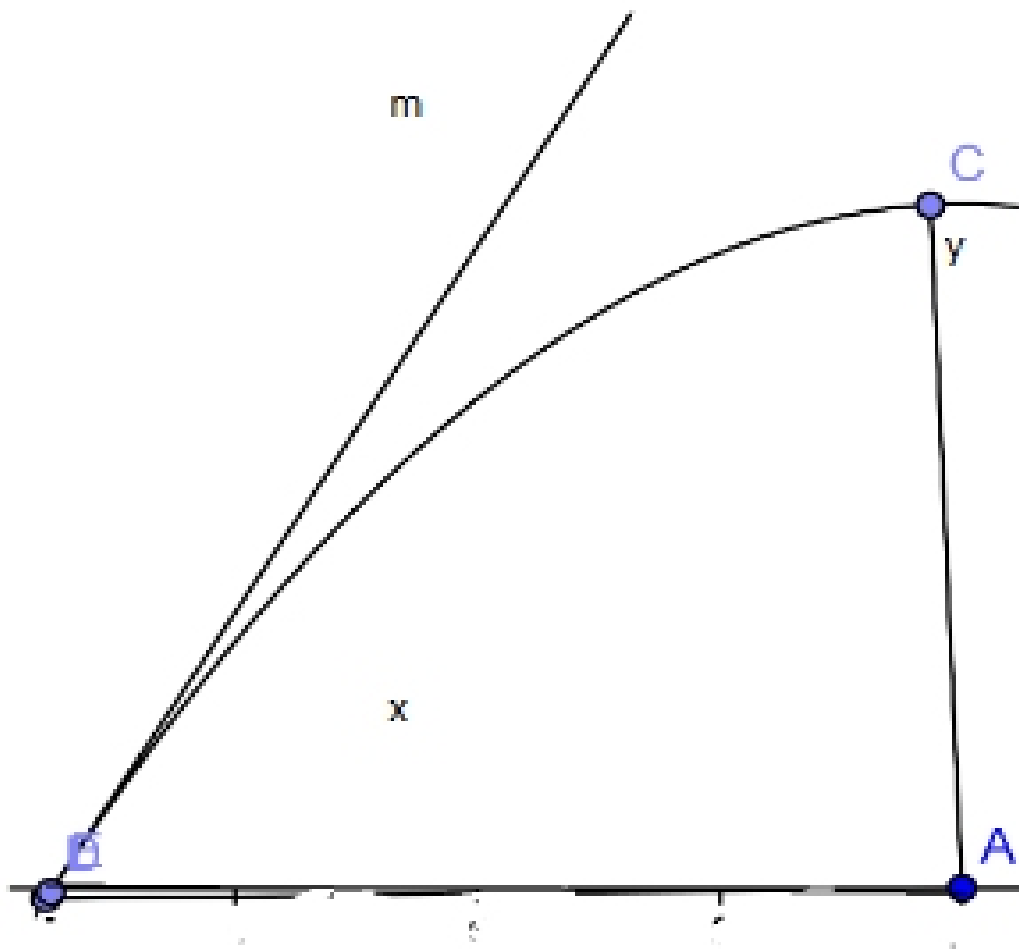
Test 2

Due 7/14/2011

Name:

Class time:

1. If air resistance is neglected, it can be shown that the stream of water emitted by a fire hose will have height  $y = -16(1+m^2)\left(\frac{x}{v}\right)^2 + mx$  feet above a point located  $x$  feet from the nozzle, where  $m$  is the slope of the nozzle and  $v$  is the velocity of the stream as it leaves the nozzle. Assume  $v$  is constant.



- a. Suppose  $m$  is also constant. What is the maximum height reached by the stream of water?  
How far away from the nozzle does the stream reach (that is, what is  $x$  when  $y=0$ )?

- b. If  $m$  is allowed to vary, find the slope that allows a firefighter to spray water on a fire from the greatest distance.
- c. Suppose the firefighter is  $x = x_0$  feet from the base of a building. If  $m$  is allowed to vary what is the highest point on the building that the firefighter can reach with the water from her hose?

2. Find the derivative of

$$f(x) = \frac{(x+1)\sqrt[3]{16-x^4}}{\sqrt{x-1}}$$