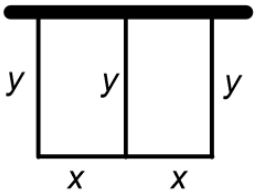
AP CALCULUS AB

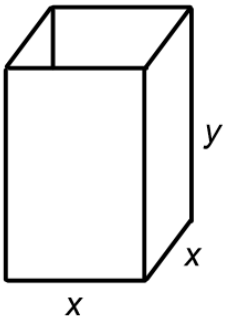
QUIZ #8 STUDY GUIDE

1) For $f(x) = x^3 - 6x^2 - 13x + 42$ on $x \in [-4, 10]$, find the values of $c \in [-4, 10]$ guaranteed to exist via the Mean Value Theorem.

2) Stanley has 200 ft of fencing, and wants to enclose two equal rectangular areas along the side of a wall as shown. Find the dimensions x and y such that the total enclosed area is maximized. Also find the maximum area, and verify the maximum with the second derivative test.



3) The square-based, open-topped box has a volume of $1000\ \text{cm}^3$. Find the dimensions x and y such that the surface area of the box is minimized. Also find the minimum surface area, and verify the minimum with the second derivative test.



4) Calculate the linearization of $f(x) = \sqrt{x}$ centered at $x = 100$. Use the linearization to estimate the value of $f(99)$. Also, calculate the percent relative error of the estimation.

5) The volume of a cube of side length s is $V = s^3$. Use the differential of S to estimate the increase in volume of the cube for $s = 10$ and $\mathrm{d}s = 0.1$. Also, calculate the percent relative error of the estimation.

6) For the triangle shown, calculate $\frac{\mathrm{d}A}{\mathrm{d}t}$ if $\frac{\mathrm{d}x}{\mathrm{d}t} = 0.2$ m/sec when $x = 7$ m. *Hint:* you will also need to calculate $\frac{\mathrm{d}\theta}{\mathrm{d}t}$.