

Exam # 2 (Closed book)

Name		Section		Date	Nov 2, 2015
Topics: Chapter 2.1, 2.2, 2.3, 2.4, 2.5				Maximum points possible: 110	
Items		Points		Your score	
Question 1		10			
Question 2		10			
Question 3		10			
Question 4		10			
Question 5		10			
Question 6		10			
Question 7		10			
Question 8		10			
Question 9		10			
Question 10		10			
Extra credit		10			
You have earned					

Answer every question:

1. Determine the equation of the tangent line to the curve defined by the equation $f(x) = \sqrt{x+2}$ when $x=5$.

2. What is absolute value function? (a) Use limit definition to Show the Absolute value function $f(x) = |x|$ has no tangent line at $X = 0$. (b) Use the limit definition to differentiate the function $f(x) = X$

3. Use whatever rules you want to take the derivative of following functions:

a. $f(x) = \sqrt{X+0}$ (b) $f(x) = \frac{1}{x^3}$ © $5X^5 + \frac{2}{X^3}$ (4) $Y = \frac{3x^4 - 7x^2 + 2}{3x^3}$ (5) $\sqrt[3]{X} - \sqrt[4]{X} + X + 32X^4$
 (6) $y = 100$

(4) A ball thrown vertically upward from the 160 feet above the ground with initial velocity of 48 feet per second which is given by $h = -16t^2 + 48t + 160$. Use calculus to find (a) How long it takes ball to reach the highest point and what is this height (b) How long does it take for the ball to hit the ground? (Note: I asked you the same question on exam #1)

(5) A farmer will construct a rectangular enclosure from 1400 feet of fencing. He plans to subdivide the enclosure into three parts. Use calculus to determine the dimensions of enclosure that maximized the enclosed area. (Note: I asked you the same question on exam #1)

(6) (a) Write the definition of continuous function. How many conditions a function has to satisfy in order to be a continuous function? (b) Determine whether the following function continuous or discontinuous (You need to draw the function and check all three conditions).

$y=f(x)= \begin{cases} x^2 + 1, & \text{if } x \leq 2 \\ 3x-1, & \text{if } x > 2 \end{cases}$
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(7) Let $f(x) = \frac{x-4}{x^2-4x}$ (a) At what point is f discontinuous? (b) Is there any removable discontinuity? © Can you differentiate the function everywhere? (d) Can you differentiate the function everywhere once you remove the discontinuity? (e) Can jump discontinuity be removed?

(8) What is HA? State all the three rules of HA. What is VA? Determine the HA and VA for the following function: $f(x) = \frac{\sqrt{x}}{x-4}$ and sketch its curve.

(9) Find the derivatives:

$$f(x) = \left(\frac{x+6}{x+5}\right)^{1/4}$$

1. $f(x) = (x^3 + 2x)\sqrt{x}$

2. $f(x) = \frac{-(x+1)}{4x+7}$

3. $f(x) = (x+1)(\sqrt{x}-1)\left(\frac{1}{x}+4\right)$

4. $f(x) = \frac{\sqrt{x}+2x}{x^2-1}$

5. $f(x) = \sqrt{2x^4+2x-1}$

6. $f(x) = \frac{\sqrt{3x-1}}{-x^2+3}$