Math 1271 - Lectures 010 and 030   Name (Print): _Sam Hanson_
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes   Teaching Assistant _David_

You may *not* use your books, notes, graphing calculator, phones or any other internet devices on this exam.

You are required to show your work on each problem on this quiz.

Problem	Points	Score
1	3	2.5
2	4	1
3	3	1
Total:	10	4.5

1. (3 points) Starting with the initial guess $x_1 = -2$, use Newton's method to approximate a root to the equation $e^x + x^2 - 3 = 0$ to eight decimal places.

$$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$$

$$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)}$$

$$x_2 \approx -1.706226706$$

$$x_3 = -1.677516748$$

$$x_4 = x_3 - \frac{f(x_3)}{f'(x_3)}$$

$$x_5 = x_4 - \frac{f(x_4)}{f'(x_4)}$$
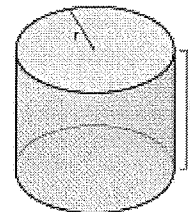
$$\boxed{x_4 = -1.67723274}$$

$+ 2.5$

2. (4 points) If 600π cm^2 material is available to make a cylinder with an open top, find the largest possible volume of the cylinder.
   Hint: The surface area of a cylinder with an open top is $\pi r^2 + 2\pi rh$, where r is the base radius, h is the height.

Max

$(0, 600)$

$\pi r^2 + 2\pi rh$

$= 2\pi r \frac{dr}{dt} + \left(2\pi r \frac{dh}{dt} + h \cdot 2\pi \frac{dr}{dt}\right) =$

$= 2\pi r + 2\pi h =$

$\frac{-2\pi h}{2\pi} = \frac{2\pi r}{2\pi}$

$-h = r$

$r = 1$

$h = -1$

$\boxed{3.5}$

$\div 1$

$???$

3. (3 points) Show that the curve $y = \sqrt{x^2+5} + 2x$ has one slant asymptote at $y = 3x$ and one horizontal asymptote at $y = 0$.

$\div 1.$

$\sqrt{x^2+5} + 2x$

$x + 2x = 3x$

Slant: $\lim_{x \to \infty} \left(\sqrt{x^2+5} + 2x - (3x)\right) = 0$

Why?

$\lim_{x \to \infty} \sqrt{x^2+5} + 2x$

$\infty + \sqrt{5} + 2\infty = \infty$

Horizontal at $y = 0$

Why?