Math 1271 - Lectures 010 and 030
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes

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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	3
2	4	3.25
3	3	.25
Total:	10	6.5

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.

$f(x) = e^x + x^2 - 3 = 0$

$f'(x) = e^x + 2x$

$x_1 = -2$

$x_2 = -1.70622671$

$x_3 = -1.67751675$

$x_4 = -1.67723274$

$x_5 = -1.67723274$

approx root = 1.67723274

$x_2 = -2 - \left(\frac{1.13533528}{-3.86466471}\right)$

$-2 + (.29377329)$

$x_2 = -1.70622671$

$x_3 = -1.70622671 - \left(\frac{.09275913}{-3.23090388}\right)$

$x_3 = -1.67751675$

$x_4 = -1.67751675 - \left(\frac{.00089981}{-3.16819614}\right)$

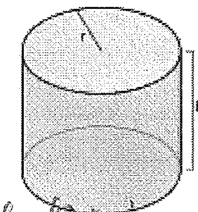
$x_4 = -1.67723274$

$x_5 = -1.67723274 - \left(\frac{.00000001}{-3.16757504}\right)$

$x_5 = -1.67723274$

+3

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 $\pi r^2 + 2\pi r h$, where r is the base radius, h is the height.



$SA = (2\pi r \cdot h) + \pi r^2$

Want
maximize volume

$V = \pi r^2 \cdot h$

Know
Can only use 600π cm^2 of material

$600\pi = 2\pi r h + \pi r^2$ solve for h

$600\pi - \pi r^2 = 2\pi r h$

$\frac{600\pi - \pi r^2}{2\pi r} = h \rightarrow h = \frac{600 - r^2}{2r}$

$V = \pi r^2 \cdot \left(\frac{600 - r^2}{2r}\right) \rightarrow \frac{600\pi r^2 - \pi r^4}{2r} = \frac{600\pi r - \pi r^3}{2}$

$V' = \frac{1200\pi - 6\pi r^2}{4} = 0 \rightarrow 1200\pi - 6\pi r^2 = 0$

$\frac{-6\pi r^2}{-6\pi} = \frac{-1200\cancel{\pi}}{-6\cancel{\pi}}$

$r^2 = 200\cancel{\pi}$

$r = \sqrt{200\cancel{\pi}}$ = max radius

$V = \pi(\sqrt{200\pi})^2 \cdot h$

Close! Very close....

+3.25

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 $y = 0$.

~~When you plug in 0 for x~~

$\lim_{x \to \infty}$

+.25