

Math 1271 - Lectures 010 and 030

Name (Print):

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Quiz 8C

11/07/17

Time Limit: 25 Minutes

Teaching Assistant

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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.

This was hard, very very
hard. I know.
I agree.

Problem	Points	Score
1	3	1.5
2	4	2.25
3	3	0.5
Total:	10	3.75

Enough time to go to
8 decimals? yeah..... I know.....

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.

$$x_1 = -2$$

+1.5

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

$$x_2 = -2 - \frac{e^{(-2)} + (-2)^2 - 3}{e^{(-2)} + 2(-2)} = \frac{1.13533528}{-3.86466471}$$

$$-2 - (-0.29377329) = -1.70622671$$

2. (4 points) If 600π cm² material is available to make a cylinder with an open top, find the largest possible volume of the cylinder.

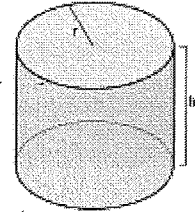
Hint: The surface area of a cylinder with an open top is $\pi r^2 + 2\pi rh$, where r is the base radius, h is the height.

$$V = \frac{4}{3} \pi r^2 h$$

$$600 = \pi r^2 + 2\pi rh$$

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

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



+ 2.25

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

$$600 = \frac{4}{3} \pi r^2 \cdot \frac{600 - \pi r^2}{2\pi r}$$

$$450 = r^2 \cdot \frac{600 - \pi r^2}{2\pi r}$$

$$900\pi = r^2 \cdot (600 - \pi r^2)$$

$$\frac{900\pi}{600 - \pi r^2} = r^2$$

$$600 - \pi r^2$$

$$r = \pm \sqrt{\frac{900\pi}{600 - \pi r^2}}$$

$$600\pi = \frac{4}{3} \pi r^2 h$$

$$450\pi = r^2 h$$

$$h = \frac{450\pi}{r^2}$$

$$SA = \pi r^2 + 2\pi r \left(\frac{450\pi}{r^2} \right)$$

$$600\pi = \pi r^2 + 2\pi r \left(\frac{450\pi}{r^2} \right)$$

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 $y = 0$.

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

$$y = x + \sqrt{5} + 2x$$

$$y = 3x + \sqrt{5}$$

This doesn't

mean enough

to count toward

Asymptote so...

$$y = 3x$$

need

some limits

here ... to 0.5 zero

There is no fraction for this function so

the H.A. would be

$$0 = \sqrt{x^2 + 5} + 2x$$

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

$$4x^2 = x^2 + 5$$

$$3x^2 - 5 = 0$$

$$x = 2x - \sqrt{5}$$

$$0 = x - \sqrt{5}$$

$$-x = -\sqrt{5} \quad \text{close to zero}$$