

Math 1271 - Lectures 010 and 030

Fall 2017

Quiz 8C

11/07/17

Time Limit: 25 Minutes

Name (Print):

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Teaching Assistant

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	3.5
3	3	
Total:	10	8.5/6

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.

$$x_{n-1} = x_n - \frac{e^x + x^2 - 3}{e^x + 2x}$$

$$\frac{1.135}{-3.8646}$$

$$+2.5$$

$$\text{Sign } f(x) \quad -2 - \frac{1.135}{-3.8646}$$

$$x_2 = 1.8646 \quad \frac{6.93}{10.18255}$$

$$x_3 = 1.8646 - \frac{10.18255}{1.6694}$$

$$x_3 = 1.18402 - \frac{1.6694}{5.6355}$$

$$x_4 = 0.88768 - \frac{0.21747}{4.204}$$

$$x_5 = 0.83595069 - \frac{0.005819}{3.978}$$

$$x_6 = 0.8344879 - 0.$$

$$x_7 = 0.834481286 -$$

$$x_8 = 0.83448677$$

this is a root!

unfortunately
yr error in $x_1 \rightarrow x_2$
made it the wrong one,
but nice recovery.

2. (4 points) If $600\pi \text{ cm}^2$ 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.

+3.5
(if you)

it would $600\pi = \pi(r^2 + 2rh)$

have worked $600 = r^2 + 2rh$

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

wrong
formula

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

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

$$\frac{dV}{dr} \left(V = \frac{2400 - 4r^2}{6r} r^2 \right)$$

$$\frac{6r(-8r) - (2400 - 4r^2)6}{(6r)^2}$$

$$-48r^2 - (2400 - 4r^2)6$$

$$-14400 - 24r^2$$

$$-14400 - 24r^2 / (6r^2) (r^2) +$$

$$(r^2) \frac{-14400 - 24r^2}{36r^2}$$

$$\frac{-14400r^2 - 24r^4}{36r^2} +$$

$$\frac{4800r - 8r^3}{6r}$$

$$\frac{-2400 - 4r^2}{6} +$$

$$\frac{600 - r^2}{6/8}$$

$$\frac{-1800 - 5r^2}{6} \times 6 = 0 \times 6$$

$$-1800 - 5r^2 = 0$$

$$-1800 = 5r^2$$

$$r^2 + 2r \left(\frac{2400 - 4r^2}{6r} \right)$$

$$\frac{4800r - 8r^3}{6r}$$

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 $y = 0$.

$$\lim_{x \rightarrow a} \sqrt{x^2 + 5} + 2x$$

+0

$$r = 18.973$$

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

$$600 = 1130.97 + 119.2h$$

$$h = 4.45$$

$$V = 1661.38 \text{ cm}^3$$

