Math 1271 - Lectures 010 and 030 **Name (Print):** BASHIR JAMA
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	1.75
2	4	1.25
3	3	6
Total:	10	3

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.

$x_1 = -2$

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

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

$x_{n+1} = x_n - \frac{f(x_1)}{f'(x_1)}$

$x_2 = x_1 - \frac{f(-2)}{f'(-2)} = -2 - \frac{1.13533528}{-3.86466471} = -1.70622671$

$f(-2) = e^{-2} + (-2)^2 - 3$
$= .135335 + 4 - 3$
$= 1.13533528$

$f'(-2) = e^{-2} + 2(-2)$
$= .135335 - 4$
$= -3.86466471$

$f(x_2) = e^{x_2} + (x_2)^2 - 3$
$f'(x_2) = e^{x_2} + 2(x_2)$

My Answer is
-3.420567

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = -1.70622671 - \frac{-5.729720}{-3.342984} = -3.42057661$

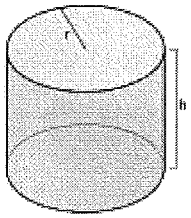
$x_4 = x_3 - \frac{f(x_3)}{f'(x_3)} = -3.420567$

0.181549541 1.713953941
-2.91126958

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.

$S = \pi r^2 + 2\pi rh$
$V = 600\pi\ cm^2$
$V = \frac{1}{3}\pi r^2 h$
$A = ?$
$\therefore V = \pi r^2 h$

I need to work on this
I studied fencing
&
Cone problems.
Sorry about this



+1.25

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 $y = 0$.

$y = \sqrt{x^2+5} + 2x$
$(x^2+5)^{1/2} + 2x$

And this One.

+0

Don't be discouraged!

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

Name (Print): Amanda Snyder

Teaching Assistant: David Demark

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

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

$-2 + (.29377329)$

$x_2 = -1.70622671$

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

$x_3 = -1.67751675$

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

$x_4 = -1.67723274$

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

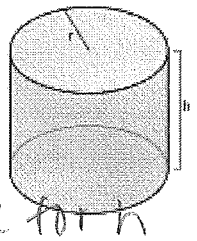
$x_5 = -1.67723274$

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

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

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

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

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

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

$\frac{-6\pi r^2}{-6\pi} = \frac{-1200\pi}{-6\pi} \rightarrow r^2 = 200\pi$

$r = \sqrt{200\pi}$ = 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~~

$\lim_{x \to \infty} \pm 1.25$

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

Name (Print): Ellie Hedlund

Teaching Assistant: David DeMark

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	1.5
2	4	1
3	3	1
Total:	10	3.5

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.

+1.5

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} \qquad f'(x) = e^x + 2x$$

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

$x_2 = -1.70622671$

$x_3 = -1.97129009$

$x_4 = -1.73092866$

$x_5 = -1.9477436$

$x_6 = -1.75051225$

$x_7 = -1.92847796$

$x_8 = -1.76710862$

$x_9 = -1.91273715$ ...

$x_{10} = -1.78078217$

$x_{11} = -1.89988631$

$x_{12} = -1.79202337$

(I'm more just intrigued than calling you out)

↓

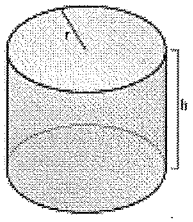
... I earnestly have no idea how you got those numbers & usually I can tell. I imagine calculation errors but the fact it keeps jumping between two values is fascinating

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.

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

$SA = 600\pi\ cm^2$

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



$\frac{ds}{dt} = 2\pi r \cdot r' + 2\pi r' \cdot h'$

+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 $y = 0$.

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

$y = \sqrt{0^2+5} + 2(0)$ +1

$y = \sqrt{5}$ = y-int

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

$0 =$

$\lim_{x\to\infty} (f(x) - mx+b)$

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

Math 1271 - Lectures 010 and 030 **Name (Print):** Jagi Gerbite
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David Demark

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	1
2	4	3.5
3	3	2
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.

$e^x + x^2 - 3 = 0$ $\quad x_1 = -2$ $\quad f'(x) = e^x + 2x$

$x_{n+1} = x_n - \frac{f(x)}{f'(x)}$

$x_2 = -2 - \frac{8.389056110}{3.389056110}$

$x_2 = -4.475333704$

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

+ 1

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.

$600\pi\ cm^2$ material

(+1,5)

$V = \pi r^2 h$

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

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

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

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

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

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

$V' = 300 - \frac{3}{2}\pi r^2$

+3.5 right steps, several errors along the way

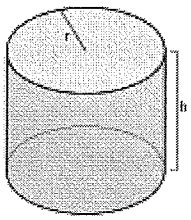
$0 = 300 - \frac{3}{2}\pi r^2$

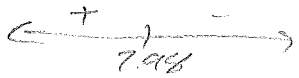
nice work!

$-300 = -\frac{3}{2}\pi r^2$

$r^2 = 63.66$

$r = 7.98$ ← critical point





$h = \frac{399.99}{50.14}$

$h = 7.98$

$V = \pi r^2 h$

$V = \pi(7.98)^2(7.98)$

$V = 1596.46\ cm^3$

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 $y = 0$.

+2

slant

horizontal

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

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

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

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

$\lim_{x\to\infty} x^2 + 5 - x^2 = -b^2$ multiply by conjugate?

$\lim_{x\to\infty} 5 = -b^2$

$\lim_{x\to\infty} \sqrt{5} = -b$

$\lim_{x\to\infty} b = -\sqrt{5}$

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

$\lim_{x\to\infty} x^2 + 5 + 4x^2 = 0$

$\lim_{x\to\infty} 5x^2 + 5 = 0$

$\lim_{x\to\infty} x^2 = -1$

we should never see that

should get $(a+b)^2 \neq a^2 + b^2$

google "The freshman's dream"

Math 1271 - Lectures 010 and 030 **Name (Print):** William Yankosky
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant _____

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

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

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.

$x_1 = -2$

$e^x + x^2 - 3 = -2$ plug into x

$e^x + 2x$

-5.729660031

~ 1.6615

$-2 - 1.135$

1.135335283

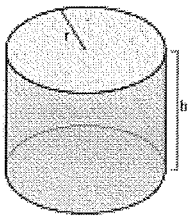
$-3.864664717 = -0.293773294$

$-2 - 0.293773294$

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.

$600\pi\ cm^2$

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



$V = \pi r^2 h$

+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 $y = 0$.

slant @ $y = 3x$

horizontal @ $y = 0$

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

$3x = \sqrt{x^2+5} + 2x$

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

Math 1271 - Lectures 010 and 030 **Name (Print):** Alex Sharp
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant Derek

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

Problem	Points	Score
1	3	2
2	4	
3	3	1,5
Total:	10	3,5

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.

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

$x_1 = -2$

$x_2 = -2 - \frac{f(-2)}{f'(-2)}$

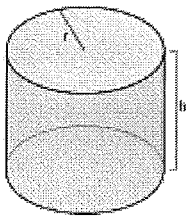
+2

$x_2 = -1.70622676$

$x_3 = -1.70622676 - \frac{f(x_2)}{f'(x_2)}$

$x_3 = -1.67716767$

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.



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 $y = 0$.

$f(x) = \sqrt{x^2+5} + 2x$

$\lim_{x \to -\infty} \sqrt{x^2+5} + 2x = 0$ $-\infty$?

therefore $f(x)$ has

a horizontal asymptote at $y = 0$

$\lim_{x \to \infty} f(x) - 3x = 0$ ± 1.3

Math 1271 - Lectures 010 and 030 **Name (Print):** Jacob Bunde
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David Demarle

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

Problem	Points	Score
1	3	
2	4	.75
3	3	
Total:	10	.75

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.

$x_1 = -2$ $f(x) = x_n - (x_n/x)$?

$e^x + x^2 - 3 = 0$

$e^{x_n} - x^2 - 3 - \left(e^{x_n} + x^2 - 3 / e^{x_n} + x^2 - 3\right) = -6.86466471?$

$\neq 0$

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.

$r = ?$
$h = ?$

$\pi r^2 xh$

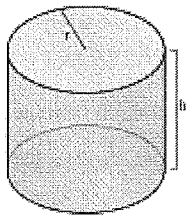
$V = 600\pi cm^2$

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

1 constant → $600\pi cm^2 = \pi r^2 + 2\pi rh$

$V = 1884.95 cm^2$

+.75



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 $y = 0$.

$f(x) = mx + b$

$f(x) = (x^2+5)^{1/2} + 2x$

+0

$f'(x) = \frac{1}{2}x^{2-1} + 2$

$f'(x) = \frac{1}{2}x^{1-5} + 2$

Math 1271 - Lectures 010 and 030 **Name (Print):** Sam Hanson
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David

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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.

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

$x_2 = 1.70622706$

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

$x_3 = -1.67751648$

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

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

$x_4 = -1.67723274$

+2.5

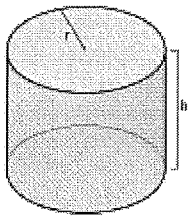
2. (4 points) If 600π cm^2 material is available to make a cylinder with an open top, find the largest possible volume of the cylinder.
Hint: The surface area of a cylinder with an open top is $\pi r^2 + 2\pi rh$, where r is the base radius, h is the height.

max

(0, 600)

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

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



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

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

$-h = r$

$r = 1$

$h = -1$

35 +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 $y = 0$.

+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?

Math 1271 - Lectures 010 and 030 **Name (Print):** Alexa White
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David DeMark

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

Problem	Points	Score
1	3	1.5
2	4	2
3	3	1.25
Total:	10	4.75

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.

$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

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

$-2 - 4.389056099$

$x_2 = -6.389056099$

$x_3 = -6.389056099 - \frac{f(x_3)}{f'(x_3)}$

$x_3 = 0.002370345$

$x_4 = 0.002370345 - \frac{f(x_3)}{f'(x_3)}$

+1.5

$x_4 = -1.998351033$

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.

$V = \pi r^2 h$

$\frac{dV}{dt} = 2\pi r \frac{dr}{dt} \frac{dh}{dt}$

$\frac{dV}{dt} = 2\pi \left(\frac{600\pi}{2\pi + \frac{dh}{dt}} \right) \frac{dh}{dt}$

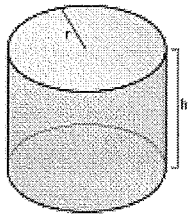
+2

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

$600\pi = 2\pi r \frac{dr}{dt} + \frac{dr}{dt} \frac{dh}{dt}$

$600\pi = \frac{dr}{dt} \left(2\pi + \frac{dh}{dt} \right)$

$\frac{600\pi}{2\pi + \frac{dh}{dt}} = \frac{dr}{dt}$



ϵ? What is this?

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 $y = 0$.

$x + 2x$

HA $b = 0$

$\lim_{x \to \infty} \sqrt{x^2+5} + 2x - 3x = b$

+1.25

$\sqrt{\infty^2 + 5} + 2\infty - 3\infty = b$

$\infty + 2\infty - 3\infty = 0$

$3\infty - 3\infty = 0$

That doesn't work — you can't do arithmetic w/ infinity.

Math 1271 - Lectures 010 and 030 **Name (Print):** Jack Linden
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes 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	1.25
2	4	3.5
3	3	2
Total:	10	6.75

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.

Newton's Method: $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

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

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

$x_2 = -2 - \left(\frac{e^{(-2)} + (-2)^2 - (3)}{e^{(-2)} + 2(-2)}\right) \rightarrow x_2 = -0.129377329$

(2nd root approximation)

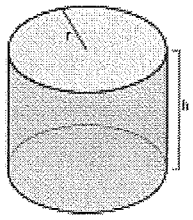
+1.25

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.

$V = \pi r^2 h$

+3.5

$SA = \pi r^2 + 2\pi rh$
$V = \pi r^2 h$
$600\pi = \pi r^2 + 2\pi rh$
$\frac{600\pi - \pi r^2}{2\pi r} = h$



Substitute: $V = \pi r^2 \left(\frac{600\pi - \pi r^2}{2\pi r}\right)$ something went wrong here

simplify: $V = r\left(\frac{600 - r}{2}\right) \rightarrow V = r(300 - r)$
$V = 300r - r^2$

Different: $V' = 300 - r$
$r = 300$

$SA = \pi r^2 + 2\pi rh$
$600\pi = \pi(300)^2 + 2\pi(300)h$
$\frac{600\pi - \pi(300)^2}{2\pi(300)} = h$
$= \frac{600\pi - 90000\pi}{600\pi}$

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 $y = 0$.

If $y = \sqrt{x^2+5} + 2x$, then ~~$y = \sqrt{x^2+5} + 2x$~~ NO which simplifies to $y = x + \sqrt{5} + 2x$ or $y = 3x + \sqrt{5}$. As the $\lim_{x\to\infty}$ approaches larger x-values, the $3x$ term will dominate the function and the $\sqrt{5}$ shift won't really matter. Thus, for the linear equation $y = 3x + \sqrt{5}$, a slant asymptote will occur at $y = 3x$.

+1.25

need an actual limit computation

Horizontal Asymptote: when slope = 0 / $y = c$

+.75 $y = (x^2+5)^{1/2} + 2x$

$y' = \frac{2}{2(\sqrt{x^2+5})} + 2$

$y' = \frac{1}{\sqrt{x^2+5}}$

$y' = \frac{1}{x+\sqrt{5}}$ as x approaches ∞, the slope becomes 0

need a bit more than just slope, but this would work for extra

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

Name (Print): Scott Smith

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	1.25
2	4	2.5
3	3	
Total:	10	3.25

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.

$\frac{d}{dx} e^x = e^x$

$\frac{d}{dx} x^2 = 2x$

$\frac{d}{dx} -3 = 0$

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

+1.25

$X_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$

$2.2937723 = -2 - \frac{e^{-2} + -2^2 - 3}{e^{-2} + 2(-2)}$

0.13533528

2.293773214

$\frac{9.912269111 + -4.90336881 - 3}{9.912269111 + 4.587596588}$

$\frac{2.00889429}{14.4998157}$

0.13854619

$X_3 = 2.155227162$

$8.629849813 + 4.5543816 - 3$

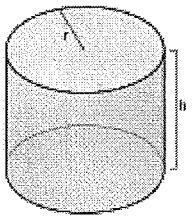
$\frac{10.0842372}{0.11587657}$

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.

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

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

+2.5



$600 = r^2 + rh$

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

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

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

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 $y = 0$.

Math 1271 - Lectures 010 and 030 **Name (Print):** Jessica Carlson
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes 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
2	4	1.5
3	3	.5
Total:	10	4

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.

+2

$$-2 - \frac{e^x + x^2 - 3}{e^x + 2x} = -1.706$$

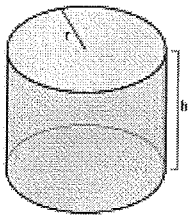
This doesn't work if you only record your x_n's to 3 decimal places.

$$-1.706 - \frac{e(-1.706) + (-1.706)^2 - 3}{e(-1.706) + 2(-1.706)} = -1.6775$$

$$-1.6775 - \frac{e(-1.6775) + (-1.6775)^2 - 3}{e(-1.6775) + 2(-1.6775)} = -1.6772$$

$$-1.6772 - \frac{e(-1.6772) + (-1.6772)^2 - 3}{e(-1.6772) + 2(-1.6772)} = -1.6772778$$

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.



* Surface Area = $\pi r^2 + 2\pi rh = 600\pi$ cm^2
* Volume = $\pi r^2 h$

+1.5

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

$r(\pi r + 2\pi h) = 600\pi$ cm^2

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 $y = 0$.

that doesn't work

* $\sqrt{x^2+5} + 2x \rightarrow x + 5 + 2x \rightarrow 3x + 5$

+.5

$\lim_{x\to\infty} 3x+5 = \infty$

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

Math 1271 - Lectures 010 and 030 **Name (Print):** Ted Sorensen
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David Dennerlein

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	1.75
3	3	.75
Total:	10	5.5

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.

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = -2 - \frac{e^{-2} + 4 - 3}{e^{-2} - 4} = -2 - \frac{1.13533528}{-3.86466471} = -1.70622670$

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = -2 - \frac{e^{-1.70622670} + 2.91120955 - 3}{e^{-1.70622670} - 3.41245340} = -1.70622670 - \frac{.09275909}{-3.23890386}$

$x_4 = x_3 - \frac{f(x_3)}{f'(x_3)} = -1.67751675 - \frac{.18683736 + 2.81406245 - 3}{.18683736 - 3.35503350} = \frac{.00089981}{-3.16819614} = -1.67723274 = -1.67751675$

$x_5 = -1.67723274 - \frac{.18689044 + 2.81310966 - 3}{.18689044 - 3.35446555} = \frac{.00000001}{-3.16757506} = -1.67723271$

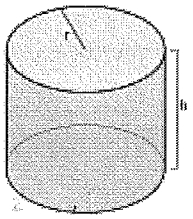
$x_6 = -1.67723271$ + 3 stop at x_6

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.

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

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

+1.75



find r using 600π cm^2 in the equation I found then when you find r you use $h = \frac{\pi r^2}{2\pi r}$ to get h & you have height & radius.

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 $y = 0$.

$y = \frac{2x}{x+\sqrt{5}} \sim 2x$ assumption

$\lim_{x\to\infty} f(x) - 2x = y$-int

+.75

Math 1271 - Lectures 010 and 030 **Name (Print):** Todd Ahrenholz
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes 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	3
2	4	3.25
3	3	
Total:	10	6.25

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.

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

$x_2 = -2 - \frac{1.135335283}{-3.864684117} \rightarrow x_2 = -1.706226706$

$x_3 = -1.706226706 - \left(\frac{.092759114}{-3.230903857}\right)$ $x_3 = -1.677516748$

$x_4 = -1.677232736$

$x_5 = -1.677232709$

$x_6 = -1.677232709$

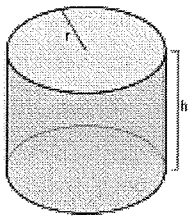
+3

$x_6 = -1.67723270$

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.

$S.A. = \pi r^2 + 2\pi rh$

$V = \pi r^2 h$



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

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

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

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

$\rightarrow V' = \frac{600\pi - \pi r^2}{2} - \frac{\pi r^2 \cdot 2}{2}$

+3.75

$V = ?$

$V' = \frac{600\pi - 3\pi r^2}{2} \rightarrow \frac{600\pi}{3\pi} = \frac{3\pi r^2}{3\pi}$

$200 = r^2$

$r = \sqrt{200}$

$h = \frac{600 - \sqrt{200}^2}{2\sqrt{200}} \rightarrow \frac{600 - 200}{2\sqrt{200}} \rightarrow \frac{400}{2\sqrt{200}} \rightarrow h = \frac{200}{\sqrt{200}}$

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 $y = 0$.

$y = (x^2+5)^{\frac{1}{2}} + 2x \rightarrow y = \frac{2x}{(x^2+5)^2}$

Domain: $\mathbb{R}$ no VA function

$y' = \frac{2(x^2+5)^2 - 8x^2(x^2+5)}{(x^2+5)^4}$

$\frac{1}{2}(x^2+5)^{-\frac{1}{2}} \cdot 2x$

$\lim$

-0

Math 1271 - Lectures 010 and 030 **Name (Print):** Jonah Jensen
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David DeMark

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	1.5
2	4	2.5
3	3	.5
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.

+1.5

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} \qquad f(x) = e^x + x^2 - 3 \qquad f'(x) = e^x + 2x$$

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

$x_2 = -2.29377329$

$x_3 = -2.29377329 + \left(\frac{(e^{-x_2} + (x_2)^2 - 3)}{e^{-x_2} + 2(x_2)}\right)$

$x_3 = -3.32315689$

4.61849578

-4.41866151

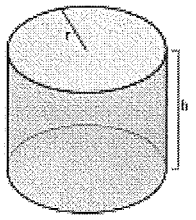
$x_4 = -4.54541071$

$x_5 = -6.49154775$

$x_6 = -9.50672083$

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.

$V = \pi r^2 \cdot h \quad SA = \pi r^2 + 2\pi rh$



$V = \pi r^2 \cdot \left(\frac{600\pi}{\pi r^2} + \frac{600\pi}{2r\pi}\right) \quad \frac{600\pi}{\pi r^2 + 2\pi r} = \frac{\pi r^2 + 2\pi rh}{\pi r^2 + 2\pi r}$

$V = \frac{600\pi r^2}{r^2} + \frac{600\pi r^2}{2r} \quad \frac{600\pi}{\pi r^2 + 2r\pi} = h \quad V = \pi r^2 \cdot \frac{600\pi - \pi r^2}{2\pi r}$

$V = 600\pi + 300\pi r \quad + 2.5$

$V' = 300\pi \text{cm}^3$

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 $y = 0$.

$+.5$

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

$\lim_{x \to 0^-} (f(x)) = \infty$?? Should be $\sqrt{5}$... but not horizontally relevant.

$\lim_{x \to 0^+} (f(x)) = -\infty$

Math 1271 - Lectures 010 and 030 **Name (Print):** Tia Mathieu
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes 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	3
2	4	2.25
3	3	1.25
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.

$e^x + 2x$

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

$-2 - \frac{1.135525283}{-3.864664777}$

$X_5 = -1.677232701 - \frac{0.000000002}{-3.167574977}$

$X_6 = -1.677232701$

$+3$

X_2 $-1.706229294 - \frac{0.092767475}{-3.230905516}$

$-1.677516798 - \frac{0.000899963}{-3.168194241}$

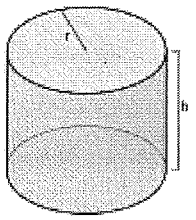
$-1.677232734 - \frac{0.000000087}{-3.167575036}$

-1.677232709

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.

surface area: $\pi r^2 + 2\pi rh$

$h = \frac{-\pi r^2}{2\pi r}$ sub for h +2.25



volume: $\pi r^2 \cdot h$

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

$V' =$

critical points:

local min:
local max: } first derivative test

end points:

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 $y = 0$.

$\lim_{x \to \infty^-} \sqrt{x^2+5} + 2x = 0$ +1.25

$\lim_{x \to \infty} \left(\sqrt{x^2+5} + 2x\right) + 3x = b$

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

Math 1271 - Lectures 010 and 030 **Name (Print):** Eileen M
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David D

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
2	4	1.75
3	3	
Total:	10	3.75

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.

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

+2

$x_1 = -2$

$x_2 = -2 - \frac{(e^{-2} + (-2)^2 - 3)}{(e^{-2} + (-2)2} = -1.70622671$

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = -2.02580942$

$x_4 = -2.29539598$

$x_5 = -2.50507457$

$x_6 = -2.65930631$

$x_7 = -2.76864113$

$x_8 = -2.84430287$

$x_9 = -2.89584656$

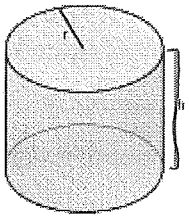
Something went wrong here...

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.

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

$\frac{600\pi}{\pi} = \frac{\pi r^2 + 2\pi rh}{\pi} \Rightarrow 600 = r^2 + 2rh$

$\Rightarrow h = \frac{600 - r^2}{2r}$ +1.75



Volume :

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 $y = 0$.

A) Domain of y :

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

Name (Print): Darla Dennis

Teaching Assistant: David DeMark

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
2	4	3.5
3	3	
Total:	10	5.5

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

$x_1 = -2$

$x_2 = -2 - \frac{e^2 + (-2)^2 - 3}{e^2 + 2(-2)} = -2 - \frac{e^2 + 1}{e^2 - 4} = -4.47533704$

$x_3 = -2.56914176$

$x_4 = -1.84268552$

Something went wrong here...

$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

~~#1 B2~~ +2

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.

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

$V = \pi r^2 h$

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

$600 = r^2 - 2rh$

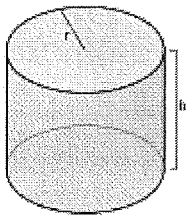
$600 - r^2 = 2rh$

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

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

$V = \frac{\pi r (600 - r^2)}{2}$

$V = \frac{600r - r^3}{2}$



$\frac{dv}{dr} = \frac{2(600 - 3r^2) - (600r - r^3)}{4}$? Should be

$\frac{dv}{dr} = \frac{1200 - 6r^2 - 600r + r^3}{4}$ $600 - \frac{3}{2}r^2$

$0 = \frac{r^3 - 6r^2 - 600r + 1200}{4}$

+ 3.5

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 $y = 0$.

Math 1271 - Lectures 010 and 030 **Name (Print):** Mckaylie Morton
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes 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	1
2	4	-2
3	3	0
Total:	10	1.3

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.

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$x_2 = -2 - \frac{e^x + x^2 - 3}{e^x + 2x}$$

$$\rightarrow x_3 = 1.96923885 - \frac{e^0 + 2^2 - 3}{e^2 + 2(0)}$$

$$x_4 = 1.22764962 - \frac{e3 + 3^2 - 3}{e^3 + 2(3)}$$

$$= 1.22764962$$

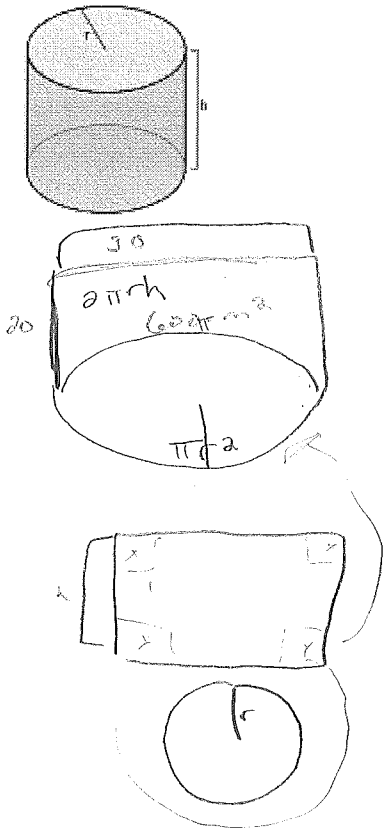
+1 +4/5 Should've been positive

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.

+.75 $\frac{600\pi}{600\pi} = \frac{\pi r^2 + 2\pi rh}{600\pi}$

$0 = \frac{r^2 + 2rh}{600}$

$\pi 2r \frac{dr}{dx} + 2\pi \frac{dr}{dx} \frac{dh}{dx}$ $0 \le x \le$



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 $y = 0$.

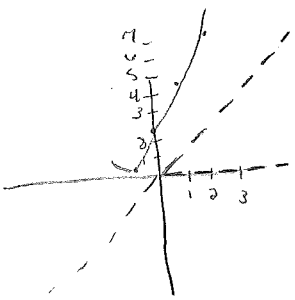
$y = 3x$

$y = 0$

$\sqrt{5}$ +2

3 + 4 = 7

$y = 7$ @ $x = 2$



Math 1271 - Lectures 010 and 030 **Name (Print):** Lydia Rose
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David DeMark

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
2	4	3.75
3	3	1.5
Total:	10	~~0.50~~ 7.25

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.

$$x_{n+1} = x_n - \frac{f(x)}{f'(x)} \qquad f'(x) = e^x + 2x$$

+2

$$x_2 = -1.70622671 = -2 - \frac{e^{-2} + 4 - 3}{e^{-2} - 4} = -2 - \frac{e^{-2} + 1}{e^{-2} - 4}$$

$$x_3 = -1.70622671 - \frac{e^{-1.70622671} + (-1.70622671)^2 - 3}{e^{-1.70622671} + 2(-1.70622671)}$$

I did not have enough time to type this into a scientific calculator. I do know what I'm doing. Except math.

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.

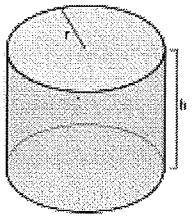
$A = \pi r^2 + 2\pi rh = 600\pi$

+3.5

$r^2 + 2h = 600$

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

there is the problem.



$V = 2\pi r^2 h$

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

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

$= 4\pi r (300 - r^2)$

$V' = 0$ at $r = 0, \pm 10\sqrt{3}$

$V'' = 4\pi (300 - r^2) + 4\pi r(-2r) = 4\pi (300 - r^2 - 2r^2) = 4\pi (300 - 3r^2)$

$= 12\pi (100 - r^2)$

$-10\sqrt{3}$ $\quad$ 0 $\quad$ $10\sqrt{3}$

$-$ $\quad$ $+$ $\quad$ $-$

r can not be (−) so

$V = 2\pi (10\sqrt{3})^2 \left(\frac{600 - (10\sqrt{3})^2}{2}\right) = 90{,}000\pi$ cm^3

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 $y = 0$.

$\lim_{x \to \infty} f(x) - mx = b$

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

+1.5

$\lim_{x \to \infty} \sqrt{x^2 + 5} + 2x - 3x = \lim_{x \to \infty} \sqrt{x^2 + 5} - x \approx 0$ ✓

$y' = \frac{1}{\sqrt{x^2 + 5}} + 2$

Therefore there is a slant asymptote at $y = 3x$

$\lim_{x \to \infty} \frac{1}{\sqrt{x^2 + 5}} + 2 = 2$

Therefore there is a horizontal asymptote at $y = 0$

should be in other direction

Math 1271 - Lectures 010 and 030 **Name (Print):** Alicia Rowland
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes Teaching Assistant David DeMark

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	1.5
2	4	2.25
3	3	0.5
Total:	10	3.75

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

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

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

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

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

This is bad

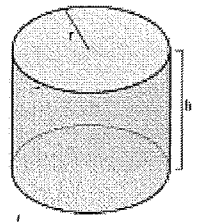
2. (4 points) If 600π cm^2 material is available to make a cylinder with an open top, find the largest possible volume of the cylinder.
Hint: The surface area of a cylinder with an open top is $\pi r^2 + 2\pi rh$, where r is the base radius, h is the height.

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

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

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

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



+2.25

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

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

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

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

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

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

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

$450 = r^2 h$

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

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

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

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 $y = 0$.

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

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

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

need some limits here ... +0.5 zero

This doesn't mean enough to count toward Asymptote so...

$y = 3x$

There is no fraction for this function so the H.A. would be

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

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

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

$4x^2 - 5 = x^2$

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

$0 = x - \sqrt{5}$

$-x = -\sqrt{5}$

$x = \sqrt{5}$ ← close to zero

Math 1271 - Lectures 010 and 030 **Name (Print):** Yuzheng Chen
Fall 2017
Quiz 8C
11/07/17
Time Limit: 25 Minutes 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	3
2	4	3.75
3	3	2
Total:	10	8.75

well done!

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.

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

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

$x_1 = -2$

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = -1.70622606$

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = -1.67751687 48$

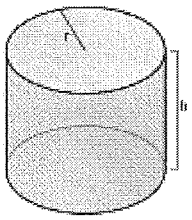
$x_4 = x_3 - \frac{f(x_3)}{f'(x_3)} = -1.67723236$

$x_5 = x_4 - \frac{f(x_4)}{f'(x_4)} = -1.67723209$

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

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



$V = \pi r^2 h$

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

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

+3.75

$V' = -\frac{3\pi}{2} r^2 + 300\pi$

$-\frac{3\pi}{2} r^2 + 300\pi = 0$

$r = 10\sqrt{2}$

$h = 10\sqrt{2}$

$V = ?$

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 $y = 0$.

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

$= \infty$

+2

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

$\lim_{x\to-\infty} \sqrt{x^2+5} + 2x = \lim_{x\to\infty} \sqrt{x^2+5} + \lim_{x\to+\infty} 2x$ can't break that up

$= \infty - \infty$

$= 0$

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

Name (Print): Bailey Brandel

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	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.

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

$-2 - \frac{1.135}{-3.8646}$

Sign fix

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

$x_3 = 1.8646 - \frac{1.135}{-3.8646}$

$x_3 = 1.184402 - \frac{1.6694}{5.6355}$

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

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

$x_6 = 0.8344879 - 0.$

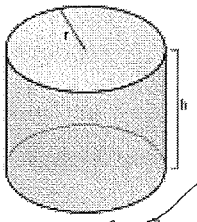
$\frac{1.135}{-3.8646}$ +2.5

$x_7 = 0.834481286 -$

$x_8 = 0.83448677$

this is a root! unfortunately, yr error in $x_1 \to x_2$ made it the wrong one, but nice recovery.

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.



+3.5
(I think it would have worked out otherwise)

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

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

$600 = r^2 + 2rh$

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

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

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

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

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

$-48r^2 - (14400 - 24r^2)$

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

(take out $6r^2$) $\frac{-14400r^2 - 24r^4}{36r^2} +$

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

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

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

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

$-1800 - 5r^2 = 0$

$+5r^2 \quad +5r^2$

$-1800 = 5r^2$

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

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

$r = 18.973$

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

$600 = 1130.97 + 119.2h$

$h = 4.45$

$V = 1661.38$ cm^3

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 $y = 0$.

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

$+0$