MS 101

Sample Final Exam

You should attempt the question before looking at the answer.

May 2-2:04 PM

01

$f(x) = 2.7^x$

$f(3.1) = 2.7^{3.1} \approx 21.738$

May 2-2:07 PM

02

$A = 750\left(1 + \frac{.05}{12}\right)^{(12*10)}$

≈ 1235.26

May 2-2:08 PM

03

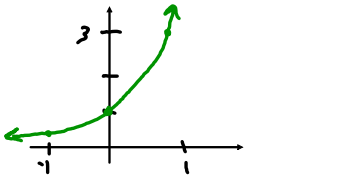
$A = 750\,e^{(.05(10))} \approx 1236.54$

May 2-2:09 PM

04

$g(x) = 3^x$

x	-1	0	1
$g(x)$	$\frac{1}{3}$	1	3



May 2-2:10 PM

05

$8^2 = 64 \iff \log_8(64) = 2$

May 2-2:12 PM

06

$\log_2(8) = 3 \iff 2^3 = 8$

May 2-2:13 PM

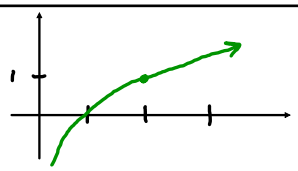
07

$f(x) = \log(x)$

$f(15) = \log(15) \approx 1.176$

May 2-2:14 PM

08



$f(2) = \log_a(2) = 1$

$a^1 = 2$

$f(x) = \log_2(x)$

May 2-2:15 PM

09

$\log(2x) = \log(2) + \log(x)$

May 2-2:18 PM

10

$$\frac{\log(x) - \log(y)}{2}$$

$$\frac{1}{2}\left(\log(x) - \log(y)\right) = \frac{1}{2}\log\left(\frac{x}{y}\right)$$

$$= \log\left(\left(\frac{x}{y}\right)^{\frac{1}{2}}\right)$$

$$= \log\left(\sqrt{x/y}\right)$$

May 2-2:19 PM

11

$\ln(2^x) = x \ln(2)$

May 2-2:20 PM

12a

$4\ln(3x) = 8$

$\ln(3x) = 2$

$e^{\ln(3x)} = e^2$

$3x = e^2$

$x = \frac{e^2}{3} \approx 2.463$

May 2-2:21 PM

12b

$4 + 2\ln(x) = 12$

$2\ln(x) = 8$

$\ln(x) = 4$

$e^{\ln(x)} = e^4$

$x = e^4 \approx 54.60$

May 2-2:23 PM

12c

$e^{3x} = 9$

$\ln(e^{3x}) = \ln(9)$

$3x = \ln(9)$

$x = \frac{\ln(9)}{3} \approx .732$

May 2-2:24 PM

12d

$3e^{2x} + 1 = 10$

$3e^{2x} = 9$

$e^{2x} = 3$

$\ln(e^{2x}) = \ln(3)$

$2x = \ln(3)$

$x = \frac{\ln(3)}{2} \approx .549$

May 2-2:26 PM

13 $A = Pe^{rt}$

$950 = 750e^{5r}$

$\frac{950}{750} = e^{5r}$

$\ln\left(\frac{950}{750}\right) = \ln(e^{5r})$

$\ln\left(\frac{950}{750}\right) = 5r$

$\frac{\ln\left(\frac{950}{750}\right)}{5} = r$

$.0473 \approx r$

4.73%

May 2-2:27 PM

14 $P = 200e^{kt}$

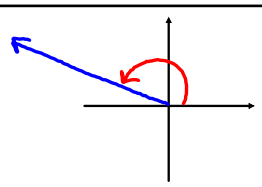
$250 = 200e^{k5}$

$\frac{\ln\left(\frac{250}{200}\right)}{5} = k \approx .0446$

$0 < k \Rightarrow$ Growth

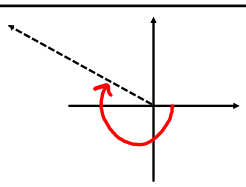
May 2-2:31 PM

15



May 2-2:33 PM

16



May 2-2:33 PM

17

You tell me

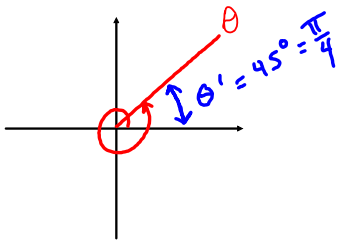
May 2-2:35 PM

18

same thing

May 2-2:35 PM

19



May 2-2:35 PM

20

$240° \frac{\pi}{180°} = \frac{4\pi}{3}$

May 2-2:36 PM

21

$\frac{2\pi}{3} \cdot \frac{180^\circ}{\pi} = 120^\circ$

May 2-2:37 PM

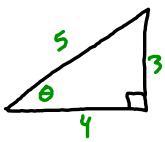
22

$60^\circ + 360^\circ = 420^\circ$

$60^\circ - 360^\circ = -300^\circ$

May 2-2:38 PM

23



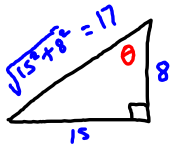
$\sin(\theta) = \frac{3}{5}$ $\csc(\theta) = \frac{5}{3}$

$\cos(\theta) = \frac{4}{5}$ $\sec(\theta) = \frac{5}{4}$

$\tan(\theta) = \frac{3}{4}$ $\cot(\theta) = \frac{4}{3}$

May 2-2:39 PM

24



$\sin(\theta) = \frac{15}{17}$ $\csc(\theta) = \frac{17}{15}$

$\cos(\theta) = \frac{8}{17}$ $\sec(\theta) = \frac{17}{8}$

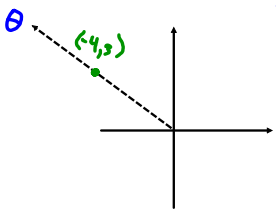
$\tan(\theta) = \frac{15}{8}$ $\cot(\theta) = \frac{8}{15}$

May 2-2:39 PM

25 a) Q2

b) $\sin\theta = \frac{y}{r} = \frac{3}{5}$ $\cos\theta = \frac{x}{r} = \frac{-4}{5}$

$\tan\theta = \frac{y}{x} = \frac{3}{-4}$

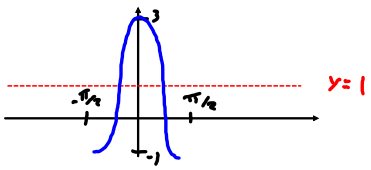


$r = \sqrt{(-4)^2 + 3^2}$

$= 5$

May 2-2:44 PM

26



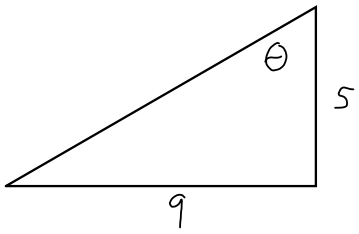
$p = \pi$ amp = 2

$b = \frac{2\pi}{p} = \frac{2\pi}{\pi} = 2$ mid: $y = 1$

$y = 2\cos(2x) + 1$

May 2-2:46 PM

27.



$\tan(\theta) = \frac{9}{5}$

$\theta = \tan^{-1}\left(\frac{9}{5}\right) \approx 60.95^\circ$

May 2-2:52 PM

28.

$\cos(\theta) = \frac{1}{\sec(\theta)}$

TRUE!

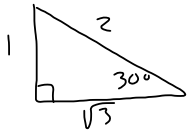
May 5-11:33 AM

29.

$2\sin(x) - 1 = 0$

$2\sin(x) = 1$

$\sin(x) = \frac{1}{2}$



$X = 30° = \frac{\pi}{6}$

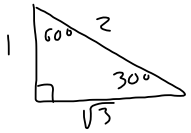
May 5-11:34 AM

30.

$2\cos(x) - 1 = 0$

$2\cos(x) = 1$

$\cos(x) = \frac{1}{2}$



$X = 60° = \frac{\pi}{3}$

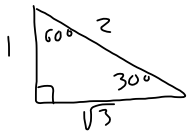
May 5-11:34 AM

31.

$\tan^2(x) = 3$

$\sqrt{\tan^2(x)} = \sqrt{3}$

$\tan(x) = \sqrt{3}$



$X = 60° = \frac{\pi}{3}$

May 5-11:34 AM

32.

$\sin^2(x) + \cos^2(x) = 1$

May 5-11:38 AM

33.

TRUE or FALSE: The maximum value of a periodic function is *always* the amplitude.

FALSE.

May 5-11:39 AM

34.

You tell me!

May 5-11:43 AM

May 5-2:49 PM