

Math 150

NEATLY PRINT YOUR LEGAL NAME: \_\_\_\_\_

Exam 3

STUDENT ID: \_\_\_\_\_

Fall 2011

DATE: \_\_\_\_\_

**SECTION:** Circle your correct section number.

Tuesday recitations: 501 503 505 507 509 511

Thursday recitations: 502 504 506 508 510 512

TEST NO.: *ASPEN*

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

\_\_\_\_\_  
Signature of student

Academic Integrity Task Force, 2004  
<http://www.tamu.edu/aggiehonor/FinalTaskForceReport.pdf>

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Signature of student \_\_\_\_\_

***NO CALCULATORS ALLOWED!***

**This is a 10-question multiple-choice exam; there is no partial credit. Each problem is worth 5 points for a total of 50 points. There will be a 5-point bonus if you have no transgressions. Transgressions include not having the correct Scantron form 882E, not filling out your Scantron form correctly, having a folded or mutilated Scantron, having your cell phone ring or vibrate, not having your TAMU student ID, not following directions, not turning in your exam and Scantron on time (you must be finished filling in your Scantron and exam cover before time is called). *The Scantron will not be returned so also mark all your answers on this test paper.***

**ALL CELL PHONES MUST BE TURNED OFF AND PLACED IN YOUR BACKPACK!**

**SCANTRON:** Please double check to make sure you have completed your Scantron correctly, as shown below.

**Name:** print your legal name neatly (*NO NICKNAMES*)

**Subject:** Math 150

**Test No.:** *ASPEN*

**Date:** November 2011

**Period:** your section number

1. Exactly solve the system of equations for all points with **real number coordinates**. Then find the **sum** of all the **y-values** of these points.

$$(x-2)^2 + (y+9)^2 = 36$$

$$8x + (y+9)^2 = 32$$

- 12
  - 18
  - 0
  - 36
  - 9
2. Which one has the correct characteristics of the function  $f(x) = 2^{x+4} + 3$ ?

	Domain	Range	x-intercept	y-intercept	Asymptote
a.	$(-\infty, \infty)$	$(-\infty, \infty)$	(0, 5)	(0, 19)	none
b.	$(-\infty, \infty)$	$(3, \infty)$	none	(0, 19)	$y = 3$
c.	$(3, \infty)$	$(-\infty, \infty)$	(0, 19)	none	$y = 4$
d.	$(-\infty, \infty)$	$(3, \infty)$	none	(0, 19)	none
e.	$(-\infty, \infty)$	$(4, \infty)$	none	(0, 5)	$y = 3$

3. The output of a particular nuclear source is  $P(t) = P(0)e^{\frac{-2t}{19}}$ , where  $t$  is time in years. What is the exact half-life of this nuclear source?

- $\frac{19 \ln 2}{2}$  years
  - $\ln 19$  years
  - $\frac{-19 \ln 2}{2}$  years
  - None of these
  - $\ln 2 - \frac{2}{19}$  years
4. How many radians and revolutions, respectively, does 570 degrees equal?
- None of these
  - $\frac{19\pi}{12}, \frac{19 \text{ rev}}{12}$
  - $\frac{19\pi}{6}, \frac{19 \text{ rev}}{12}$
  - $\frac{19\pi}{12}, \frac{19 \text{ rev}}{6}$
  - $\frac{19\pi}{6}, \frac{19 \text{ rev}}{6}$

5. Exactly solve  $3e^{-2x+4} - 7 = 20$  for  $x$ .

- a.  $2 - \frac{1}{2} \ln \frac{13}{3}$
- b.  $-\ln 3$
- c. None of these
- d.  $\ln 3$
- e.  $2 - \ln 3$

6. Given the function  $f(x) = \frac{5x^2 - 30x + 45}{x^2 - 2x - 8}$ , what are the vertical and horizontal asymptotes and the **SUM** of its zeros (if there is only one zero, just give it), respectively.

- a.  $x = 5, y = -2, y = 4; \frac{-45}{8}$
- b.  $x = -2, x = 4, y = 5; 3$
- c.  $x = -2, x = 4, y = 5; \frac{-45}{8}$
- d.  $x = 2, x = -4, y = 5; 3$
- e. None of these

7. If  $f(x) = \frac{-1}{2} \ln(4x - 8)$ , find its inverse function. You do NOT have to find its domain and range.

- a.  $f^{-1}(x) = \frac{1}{4} e^{-2x} - 2$
- b.  $f^{-1}(x) = \frac{1}{4} e^{-2x} + 8$
- c.  $f^{-1}(x) = \frac{1}{4} e^{-2x} - 8$
- d. None of these
- e.  $f^{-1}(x) = \frac{1}{4} e^{-2x} + 2$

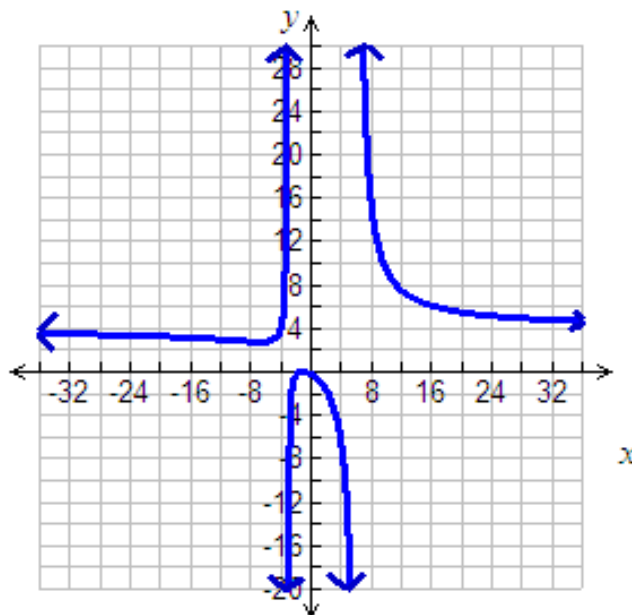
8. If  $f(x) = -6\cos(2x-7) - 8$  what are the amplitude and phase shift?

- a. 6, right  $\frac{7}{2}$
- b. -6, down 8
- c. 6, right  $\frac{7\pi}{2}$
- d. 6, left  $\frac{7}{2}$
- e. -6, right  $\frac{7\pi}{2}$

9. Exactly evaluate  $\cos\frac{23\pi}{12}$ .

- a.  $\frac{\sqrt{3}+1}{2}$
- b.  $\frac{\sqrt{6}+\sqrt{2}}{4}$
- c.  $\frac{-\sqrt{6}+\sqrt{2}}{4}$
- d.  $\frac{\sqrt{6}-\sqrt{2}}{4}$
- e.  $\frac{-\sqrt{6}-\sqrt{2}}{4}$

10. Which function is represented by the graph?



- a.  $f(x) = \frac{4(x-1)^2}{(x+6)(x-3)}$
- b.  $f(x) = \frac{4(x+1)}{(x-6)(x+3)}$
- c.  $f(x) = \frac{4(x+1)^2}{(x+1)(x-6)(x+3)}$
- d.  $f(x) = \frac{4(x-1)^3}{(x+6)(x-3)}$
- e.  $f(x) = \frac{4(x+1)^2}{(x-6)(x+3)}$

Math 150                    **NEATLY PRINT NAME:** \_\_\_\_\_

Exam 3    **STUDENT ID:** \_\_\_\_\_

Fall 2011    **DATE:** \_\_\_\_\_

**SECTION:** Circle your correct section number.

Tuesday recitations:    501    503    505    507    509    511

Thursday recitations:        502    504    506    508    510    512

TEST NO.: *SPRUCE*

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

\_\_\_\_\_  
Signature of student

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Signature of student \_\_\_\_\_

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**This is a 10-question work-out exam. Each problem is worth 5 points for a total of 50 points. Write all solutions in the space provided as full credit will not be given without complete, correct accompanying work, even if the final answer is correct. Fully simplify all your answers, and give exact answers unless otherwise stated. Justify your answers algebraically whenever possible. Circle your final answer. Remember your units!**

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The problems for the exam will be similar to those discussed in class. Of course, the numbers will be different. But not all of them, pi will still be 3.14159....

- <http://www.math.utah.edu/~cherk/mathjokes.html>

1. Give the simplest exact answers to each of the following.

a.  $\log_3 \frac{1}{27} =$

b.  $\log_b b^4 =$

c.  $\ln \sqrt{e} =$

d.  $\log 1 =$

e.  $e^{2 \ln x} =$

2. If  $\cot x = \frac{-12}{5}$  where  $\sec x < 0$ , find the exact values of all the trigonometric functions.

$\sin x =$  \_\_\_\_\_

$\cos x =$  \_\_\_\_\_

$\tan x =$  \_\_\_\_\_

$\csc x =$  \_\_\_\_\_

$\sec x =$  \_\_\_\_\_

3. Prove (verify) the trigonometric identity:  $\sin x \sin 2x = 2 \cos x - 2 \cos^3 x$ .

$\sin x \sin 2x =$



7. In interval notation, what is the domain of the function  $f(x) = \frac{\sqrt{x-4}}{\log_{11}(18-x)}$ ?

Domain in interval notation: \_\_\_\_\_

8. Given the function  $f(x) = \frac{x^3 + 4x^2 - x - 4}{x^2 - x - 20}$ , find the horizontal and vertical asymptotes, hole(s) and the y-intercept(s). Write “none,” if there are none.

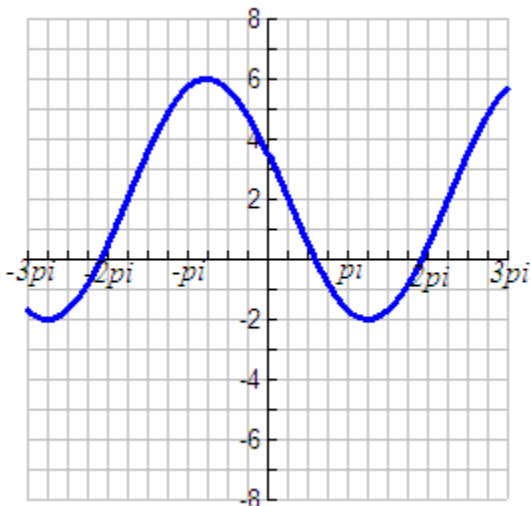
Horizontal asymptote(s): \_\_\_\_\_

Vertical asymptote(s): \_\_\_\_\_

Hole(s) as a POINT: \_\_\_\_\_

y-intercept as a POINT: \_\_\_\_\_

9. Write a function of the form  $f(x) = a \sin k(x-b) + c$ , whose graph is shown below, where  $a$ ,  $k$ , and  $b$  are **positive**, and  $b$  is as small as possible.



$f(x) =$  \_\_\_\_\_

10. If a circle has a 24 cm diameter, find the exact arc length and sector area subtended by a central angle of  $\frac{5\pi}{6}$ . Remember your units!

Arc length: \_\_\_\_\_

Sector area: \_\_\_\_\_