

SECTION: Circle your correct section number.

Tuesday recitations: 501 503 505 507 509 511 525 527 529
Thursday recitations: 502 504 506 508 510 512 526 528 530

TEST NO.: **THANKS**

"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>

My signature in this blank allows my instructor to pass back my graded exam in class or allows me to pick up my graded exam in class on the day the exams are returned. If I do not sign the blank or if I am absent from class on the day the exams are returned, I know I must show my Texas A&M student ID during my instructor's office hours to pick up my exam.

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.*

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

Date: November 2010

Test No.: **THANKS**

Period: your section number

1. In interval notation find the domain of the function $y = \ln(-x^2 - x + 30) - 4$.

- a. $(0, 5)$
- b. $(-6, 5)$
- c. $(-\infty, -6) \cup (5, \infty)$
- d. $[-6, 5]$
- e. $(-\infty, -6] \cup [5, \infty)$

2. $\lim_{x \rightarrow -\infty} \frac{5x^4 - 2x^7 - 9x + 3}{6x + 8x^7 - 4 - x^2} =$

- a. $\frac{5}{6}$
- b. $\frac{1}{4}$
- c. 0
- d. $-\frac{1}{4}$
- e. Does not exist.

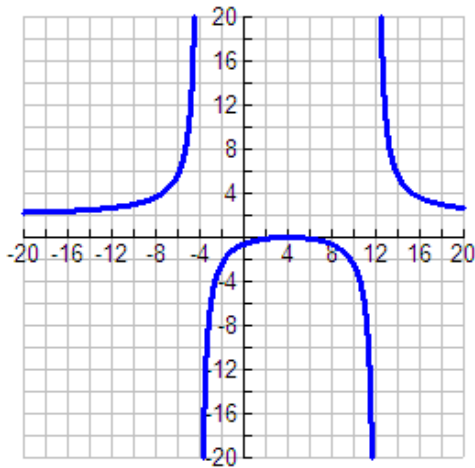
3. What is the range and y-intercept, respectively, of the function $f(x) = 5^{x+2} + 3$?

- a. $[3, \infty)$, 28
- b. $(3, \infty)$, 28
- c. $(3, \infty)$, None
- d. $[3, \infty)$, None
- e. $(-\infty, \infty)$, $\frac{\ln 3 - 2 \ln 5}{\ln 5}$

4. If $y = -\frac{1}{2} \sin(3x + 4) - 8$, what are the amplitude, period, reflection, and horizontal shift?

- a. Amplitude $\frac{-1}{2}$, period $\frac{2\pi}{3}$, reflected over x -axis, left 4 units
- b. Amplitude $\frac{1}{2}$, period $\frac{2\pi}{3}$, reflected over the x -axis, left $\frac{4}{3}$ units
- c. Amplitude $\frac{1}{2}$, period $\frac{2\pi}{3}$, reflected over the x -axis, left 4 units
- d. None of these
- e. Amplitude $\frac{-1}{2}$, period 2π , reflected over the y -axis, left $\frac{4}{3}$ units

5. Which of the following could be the rational function whose graph is shown?



- a. $f(x) = \frac{2(x-4)^2}{(x-4)(x+12)}$
- b. $f(x) = \frac{2(x-4)}{(x-4)(x+12)}$
- c. $f(x) = \frac{2(x-4)}{(x+4)(x-12)}$
- d. $f(x) = \frac{2(x-4)^2}{(x+4)(x-12)}$
- e. $f(x) = \frac{2(x-4)^3}{(x+4)(x-12)}$

6. If $\ln b = m$, $\ln c = p$, and $\ln d = r$, use the change of base formula to evaluate $\log_b c^d$.

$$\log_b c^d =$$

- a. $\frac{rp}{m}$
- b. $\frac{dm}{p}$
- c. $\frac{rm}{p}$
- d. $\frac{dp}{m}$
- e. None of these

7. *Exactly* and algebraically solve the system of equations:

$$\begin{aligned} 3x - 2y &= 6 \\ -18x &= -12y - 36 \end{aligned}$$

- $\left(x, \frac{3}{2}x - 3\right)$ where x is any real number
- No solution
- $(2, 0)$ is the unique solution
- $(0, -3)$ is the unique solution
- $\left(x, \frac{3}{2}x + 3\right)$ where x is any real number

8. Expand $f(x) = \log_b \left(\frac{5x^2}{7x-7} \right)^2$.

- $2\log_b 5 + 4\log_b x - 2\log_b 7 - 2\log_b (x-1)$
- $2\log_b 5 + 4\log_b x - 2\log_b 7 + 2\log_b (x-1)$
- $2\log_b 5 + 4\log_b x - 2\log_b 7 - 2\log_b x - 2\log_b 1$
- $2\log_b 5 + 4\log_b x - 2\log_b 7 + 2\log_b x + 2\log_b 1$
- $2\log_b 5 + 2\log_b x - \log_b 7 - \log_b (x-1)$

9. Express $3 \cdot 5^{6x-7}$ as a natural exponential expression.

- $e^{(6x-7)\ln 15}$
- $e^{6x-7\ln 15}$
- $3e^{(6x-7)\ln 5}$
- None of these
- $3e^{6x-7\ln 5}$

10. A radioactive sample decayed 80% after 100 years. What is its exact half-life?

- None of these
- $\frac{-100\ln 2}{\ln 0.8}$ years
- $\frac{100\ln 2}{\ln 0.8}$ years
- $\frac{-100\ln 2}{\ln 0.2}$ years
- $\frac{100\ln 2}{\ln 0.2}$ years

Math 150

NEATLY PRINT NAME: _____

Exam 3

STUDENT ID: _____

Fall 2010

DATE: _____

SECTION: Circle your correct section number.

Tuesday recitations: 501 503 505 507 509 511 525 527 529

Thursday recitations: 502 504 506 508 510 512 526 528 530

TEST NO.: *FAMILY*

"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 _____

NO CALCULATORS ALLOWED!

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!

So far as Napier's invention of logarithms is concerned, Lord Moulton expressed the fact very clearly when he stated: "The invention of logarithms came on the world as a bolt from the blue. No previous work had led up to it, foreshadowed it or heralded its arrival. It stands isolated, breaking in upon human thought abruptly without borrowing from the work of other intellects or following known line of mathematical thought."

1. Exactly solve $\frac{6}{e^{4-2x}} + 9 = 11$ for x .

$x =$ _____

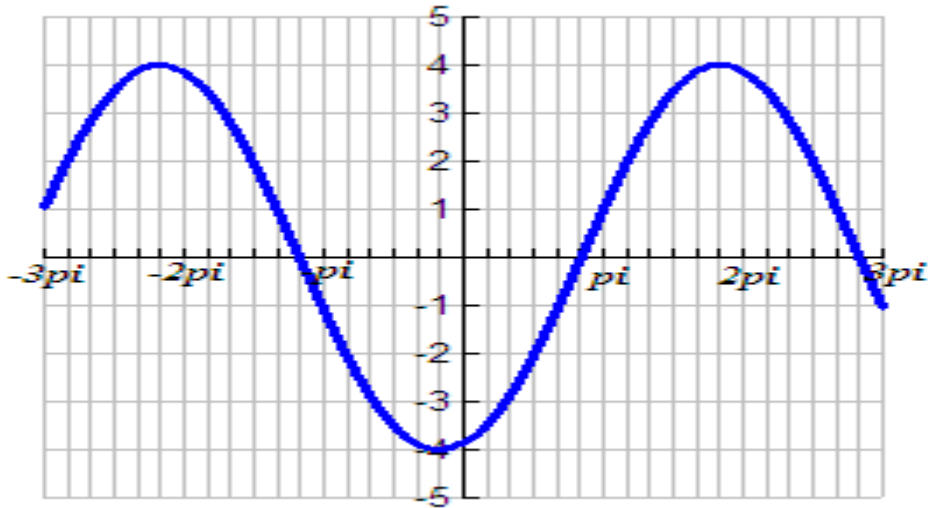
2. Exactly solve $\log_3(x+5) = 2 - \log_3(x-3)$ for x .

$x =$ _____

3. Find the x -intercept(s) of $f(x) = \frac{(x+10)(x^2 - 5x - 24)}{x^2 - 16x + 64}$.

x -intercept(s): _____

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



$f(x) =$ _____

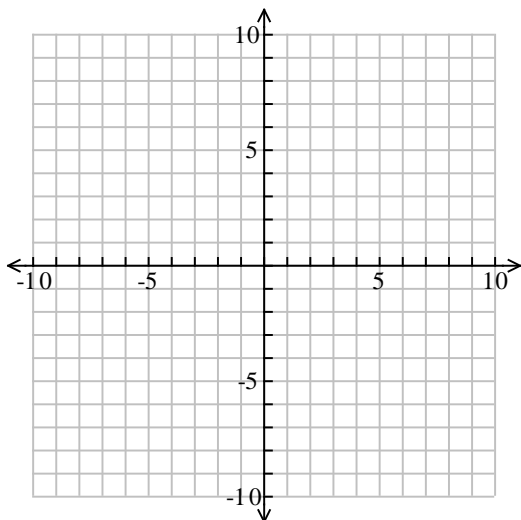
5-point Bonus: Write a function of the form $g(x) = a \cos k(x-b)$, whose graph is shown above, where a , k , and b are **positive**, and b is as small as possible.

$g(x) =$ _____

5. If $f(x) = 2 \log(x-9) - 3$, find its inverse function. You do NOT have to find its domain and range.

$f^{-1}(x) =$ _____

6. Graph $f(x) = \frac{12x-12}{x^2+x-2}$ below. Clearly sketch and label any horizontal and vertical asymptotes. Clearly sketch and label any holes.



7. *Exactly* and algebraically solve the system of equations:

$$4(x+3)^2 + 5y = -3$$

$$(x+3)^2 - y = 6$$

As point(s) the solution(s) is/are: _____

8. If $\csc x = \frac{-3}{2}$ where $\tan x < 0$, find the exact values of all the trigonometric functions.

$\sin x =$ _____

$\cos x =$ _____

$\tan x =$ _____

$\sec x =$ _____

$\cot x =$ _____

9. a. Convert $\frac{17\pi}{12}$ to degrees.

$\frac{17\pi}{12} =$ _____ degrees

b. *Exactly* evaluate $\sin\left(\frac{17\pi}{12}\right)$.

10. Prove (verify) the trigonometric identity: $\frac{\sin 2x}{\sin x} = 2 \sin x \cot x$.