

Math 150 **NEATLY PRINT NAME:** _____

Exam 3 **STUDENT ID:** _____

Spring 2010 **DATE:** _____

SECTION: Circle your correct section number: **501 502 503 504 505 506**

TEST NO.: *PETALS*

"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 _____

**You must clear your calculator BEFORE and AFTER the exam.
MEM (2nd +), Reset, ALL, Reset**

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!

The great equations of modern physics are a permanent part of scientific knowledge, which may outlast even the beautiful cathedrals of earlier ages.

- Steven Weinberg, in Graham Farmelo's *It Must Be Beautiful*, 2002

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

$\sin x =$ _____

$\cos x =$ _____

$\tan x =$ _____

$\csc x =$ _____

$\cot x =$ _____

2. If $f(x) = \frac{x^2 + 10x + 25}{3x^2 - 18x - 165}$, find the following. If there is none, write "NONE."

x -intercept(s): _____

y -intercept(s): _____

holes at $x =$ _____

horizontal asymptote(s): _____

3. Show your work (do not use a shortcut) to evaluate $\lim_{x \rightarrow \pm\infty} \frac{5x^3 - 9x^4 + 6}{10x^3 + 2x^2 - 3x}$.

4. A college decided that the condition called spring fever spreads through its students according to the model $p(t) = 1 - e^{-0.08t}$, where $p(t)$ is the portion of the students which have spring fever and t is measured in days. *Exactly* how long will it take for 90% of the students to have spring fever? Remember your units.

5. If $f(x) = \log_7(5x - 10) + 4$, find the inverse function of f . You do not have to find the domain and range.

6. In interval notation, what is the domain of $f(x) = \frac{\sqrt[4]{15-x}}{\log_7(x-11)}$?

In interval notation, the domain is _____.

7. Solve the system of equations where a is a positive constant.

$$2x - y = 10 - a$$

$$x + 2y = 2a + 5$$

8. If $f(x) = 5^{x+4} + 2$, give the following. If there is none, write "NONE."

In interval notation, the domain is _____.

In interval notation, the range is _____.

The exact x -intercept is _____.

The exact y -intercept is _____.

The asymptote is _____.

9. If a circle has a 36 cm diameter, exactly find the area of the sector subtended by a central angle of $\frac{5\pi}{6}$. Remember your units.

10. Exactly convert $\frac{2}{3}$ revolution to radians and degrees. Show work!

$$\frac{2}{3} \text{ rev} = \underline{\hspace{4cm}} \text{ rads}$$

$$\frac{2}{3} \text{ rev} = \underline{\hspace{4cm}} ^\circ$$

BONUS (5 pts): Solve the system of equations. Circle your final answer.

$$8x - 12y = 9$$

$$2x - 3y = \frac{9}{4}$$

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TEST NO.: FLOWERS

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

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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.*

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

Name: print your name neatly
Subject: Math 150
Date: April 2010

Test No.: *FLOWERS*
Period: your section number

1. If $f(x) = \frac{x^2 + 3x + 2}{x^3 + 10x^2 - 4x - 40}$ give all vertical and horizontal asymptotes.

- a. $x = -10, x = 2, y = 1$
- b. None of these
- c. $x = -10, x = -2, x = 2, y = 0$
- d. $x = -10, x = 2, y = 0$
- e. $x = -10, x = -2, x = 2, y = 1$

2. If $\log_n 2 = t$, $\log_n \pi = p$, $\log_n 3 = h$ and $\log_n 7 = s$, find the value of $\log_n \frac{54}{49\pi^9}$ in terms of h, p, s , and t .

- a. None of these
- b. $t + 3h - 2s + 9p$
- c. $t + 3p - 2h - 9s$
- d. $\frac{t + 3h}{2s + 9p}$
- e. $t + 3h - 2s - 9p$

3. Solve the system of equations.

$$x^2 + y^2 = 100$$

$$y^2 - x = 80$$

- a. $(-4, -2\sqrt{19}), (-4, 2\sqrt{19}), (5, -\sqrt{85}), (5, \sqrt{85})$
- b. $(-5, -5\sqrt{3}), (-5, 5\sqrt{3}), (4, -2\sqrt{21}), (4, 2\sqrt{21})$
- c. $(-4, 2\sqrt{19}), (5, \sqrt{85})$
- d. $(-5, 5\sqrt{3}), (4, 2\sqrt{21})$
- e. None of these

4. If a radioactive sample decays 40% in 6 years, what is its exact half-life?

- a. $\frac{-6 \ln 2}{\ln 0.6}$ years
- b. $\frac{1}{6} \ln 0.4$ years
- c. $\frac{-6 \ln 2}{\ln 0.4}$ years
- d. None of these
- e. $\frac{1}{6} \ln 0.6$ years

5. If an arc length is 5 meters of an arc subtended by a central angle of $\frac{3\pi}{8}$, what is the exact radius of the circle.

- a. None of these
- b. $\frac{40}{3}$ meters
- c. $\frac{40}{3\pi}$ meters
- d. $\frac{80}{3}$ meters
- e. $\frac{80}{3\pi}$ meters

6. Exactly solve for x : $\log_{16}(4-x) = \frac{3}{4} - \log_{16}(-x-3)$.

- a. 5
- b. -4
- c. $\frac{-7}{2}$
- d. -4, 5
- e. None of these

7. A builder bought some small wood studs for \$2.40 each and some large wood studs for \$3.20 each. There were a total of 40 wood studs for a cost of \$126.40. How many small wood studs did the builder purchase?

- a. 38
- b. 40
- c. None of these
- d. 30
- e. 2

8. Exactly evaluate $\cos \frac{7\pi}{6} + \tan \frac{7\pi}{4} + \csc \frac{\pi}{3}$.

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

9. Evaluate $\lim_{x \rightarrow \pm\infty} \frac{6x^3 - x^5 + x^2 - 9}{2x^3 + 6x^5 + 8 - 3x^2}$.

- a. $-\frac{1}{6}$
- b. Does not exist
- c. 3
- d. $\frac{1}{6}$
- e. 0

10. Exactly solve for x : $3^x x^2 + 3^x \cdot 2x = 80 \cdot 3^x$

- a. -10, 0, 8
- b. None of these
- c. -8, 10
- d. -8, 0, 10
- e. -10, 8