Math 150 **NEATLY PRINT NAME**: _____

Exam 2 **STUDENT ID**: _____

Fall 2009 **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.: ***TREAT***

"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 name neatly
Subject: Math 150 **Test No.: *TREAT***
Date: October 2009 **Period: your section number**

1. Find the standard equation of the circle whose center is the midpoint of the line segment whose endpoints are $(-2,8)$ and $(10,6)$ and whose ***diameter*** is $\sqrt{3}$.

a. $(x-4)^2+(y-7)^2=\frac{3}{4}$

b. None of these

c. $(x+6)^2+(y-1)^2=3$

d. $(x+6)^2+(y-1)^2=\frac{3}{4}$

e. $(x-4)^2+(y-7)^2=3$

2. What is the domain of the function $f(x)=\frac{\sqrt[4]{x^2+3x-40}}{x+10}$?

a. $(-\infty,-10]\cup[-10,-8]\cup[5,\infty)$

b. $(-\infty,-10]\cup[-8,5]$

c. $(-10,-8]\cup[5,\infty)$

d. $(-\infty,-10)\cup(-10,-8]\cup[5,\infty)$

e. None of these

3. Describe the end behavior of the polynomial $p(x)=-74x^{75}+38x^{89}-13x$.

a. None of these

b. As $x\to-\infty$, $p(x)\to\infty$ and as $x\to\infty$, $p(x)\to\infty$.

c. As $x\to-\infty$, $p(x)\to-\infty$ and as $x\to\infty$, $p(x)\to\infty$.

d. As $x\to-\infty$, $p(x)\to-\infty$ and as $x\to\infty$, $p(x)\to-\infty$.

e. As $x\to-\infty$, $p(x)\to\infty$ and as $x\to\infty$, $p(x)\to-\infty$.

4. Let $h(x)=(f\circ g)(x)=\left(x^2+3\right)^3+2\left(x^2+3\right)$. Identify $f(x)$ and $g(x)$.

a. $f(x)=x^3+2x,\quad g(x)=x^2+3$

b. $f(x)=x^2+3,\quad g(x)=x^3+2x$

c. None of these

d. $f(x)=x^2+2x,\quad g(x)=x^2+3$

e. $f(x)=x^3+2x^2,\quad g(x)=x+3$

5. Find all the zeros (real or complex) of the function $f(x)=4x^2+7x+5$.

a. $\frac{-7\pm\sqrt{31}}{8}$

b. $\frac{7\pm\sqrt{31}}{8}$

c. $\frac{-7\pm i\sqrt{31}}{8}$

d. $\frac{7\pm i\sqrt{31}}{8}$

e. None of these

6. Let $f(x)=\begin{cases}\frac{1}{(x-1)^2}-1 & \text{if } x<0\\ 3 & \text{if } 0\le x<2\\ \frac{1}{x^2}+1 & \text{if } x\ge 2\end{cases}$. Find the values of $f(-1)$ and $f(2)$, respectively.

a. $\frac{5}{4},\frac{3}{4}$

b. $\frac{-5}{4},\frac{3}{4}$

c. $\frac{-3}{4},3$

d. $\frac{5}{4},3$

e. $\frac{-3}{4},\frac{5}{4}$

7. Find f^{-1} for $f(x)=(x-4)^3+3$.

a. $f^{-1}(x)=\sqrt[3]{x+4}-3$

b. None of these

c. $f^{-1}(x)=\sqrt[3]{x-3}+4$

d. $f^{-1}(x)=\sqrt[3]{x-4}-3$

e. $f^{-1}(x)=\sqrt[3]{x+3}-4$

8. Find the value of *a* if the line $6x-8y=1$ is parallel to the line $ax-2y=-8$.

a. $a=\frac{3}{8}$
b. $a=\frac{3}{2}$
c. $a=\frac{-2}{3}$
d. None of these
e. $a=\frac{-8}{3}$

9. Which points are on the graph of $x^2y^3=y^4+y$?

a. $(0,0)$ and $(1,1)$
b. $(0,0)$ and $\left(\sqrt{2},1\right)$
c. None of these
d. $(1,1)$ and $\left(\sqrt{2},1\right)$
e. $\left(\sqrt{2},1\right)$ and $(0,1)$

10. Consider the following three statements.

I. If the graph of an equation with variables *x* and *y* is symmetric with respect to the *y*-axis, then when you replace *x* with $-x$ in the equation, the graph remains unchanged.

II. The equation $y=|x+2|+3$ has no *y*-intercept.

III. The function $f(x)=\frac{1}{x}$ is decreasing for $x<0$ and increasing for $x>0$.

a. Only I is true.
b. Only I and II are true.
c. Only III is true.
d. I, II, and III are true.
e. I, II, and III are false.

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Fall 2009 **DATE**: _____

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

TEST NO.: ***PUMPKIN***

"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

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

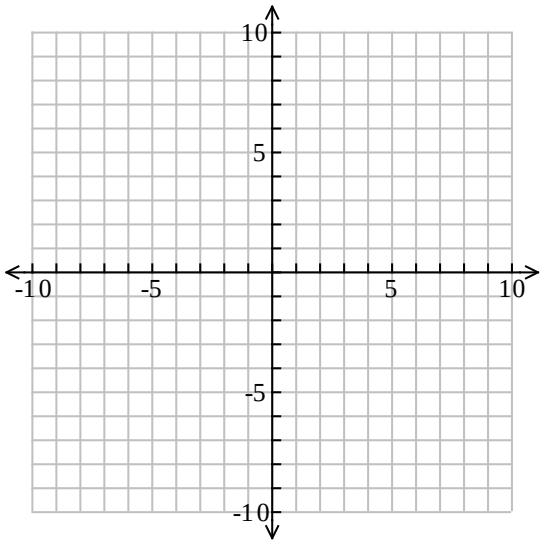
This is a 10-question work-out exam. Each problem is worth 5 points for a total of 50 points. Write all solutions in the space provided as full credit will not be given without complete, correct accompanying work, even if the final answer is correct. Fully simplify all your answers, and give exact answers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

One cannot escape the feeling that mathematical formulas have an independent existence and intelligence of their own, that they are wiser than we are. Heinrich Hertz

1. Evaluate the difference quotient of the function $f(x)=\frac{-7}{5x}$ and then fully simplify. Remember to first give the difference quotient.

2. Sketch any function that satisfies ***all*** of the following: is increasing on the intervals $(-\infty,-6)$ and $(3,\infty)$; is decreasing on the interval $(-6,3)$; has x-intercepts at -8, -1 and 5; has a y-intercept of -2; and is undefined at $x=-6$.

You are not being graded on your artistic skills here; just draw a function that meets ***all*** of the requirements given.



3. It takes Richard 5 days longer than Sherry to do the gift shopping. If they shop together, it takes them $\frac{14}{9}$ days. Exactly how long does it take Sherry by herself to do the gift shopping? Define the variable before solving the problem.

4. Given the function $f(x) = -9x^2 - 30x - 115$.

a. (2 pts) Algebraically find the vertex. Give an exact answer.

b. (1 pt) What is the exact minimum value? If there is no minimum value, write "NONE."

c. (1 pt) What is the exact maximum value? If there is no maximum value, write "NONE."

d. (1 pt) What is the axis of symmetry?

5. Suppose that we are given the graph of the function *f*. How must we transform the graph of *f* to obtain the graph of *g* if $g(x) = -4f(x-6)+2$? List the specific graph transformations in order in which they must be performed.

First transformation: _____

Second transformation: _____

Third transformation: _____

Fourth transformation: _____

6. Algebraically prove $f(x) = 5x - 7$ is a one-to-one function.

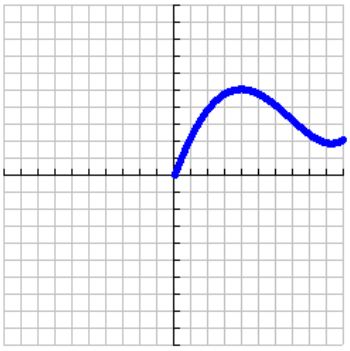
Therefore the function $f(x) = 5x - 7$ is a one-to-one function.

7. An open box is constructed from an 18-meter by 5-meter rectangular sheet of cardboard by cutting squares of equal size from each corner and folding up the sides. What should the dimensions be of the cutout squares for the box to have maximum volume? Remember your units, and give your answer to 2 decimal places. Hint: Use your calculator!

Dimensions of square: _____

For an extra 5-points, what is the maximum volume (remember your units) to 2 decimal places?

8. Complete the graph so that it is symmetric about the origin.



9. Let $f(x)=x^2-1$, $g(x)=-x-3$, and $h(x)=\sqrt{x-1}$

a. (2 pts) $(f\circ h)(x)=$

b. (1 pt) In interval notation, what is the domain of $(f\circ h)(x)$?

c. (2 pts) $(h\circ f\circ g)(1)=$

10. (3 pts) If $f(x)=\dfrac{1}{5x-10}$, find its inverse function.

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

(1 pt) Domain of $f^{-1}(x)$ in interval notation is _____

(1 pt) Range of $f^{-1}(x)$ in interval notation is _____