MATH 1103 COMMON FINAL EXAM
MULTIPLE CHOICE SECTION
Spring 2011

Please print the following information:

Name:	_____	Instructor:	_____
Student ID:	_____	Section/Time:	_____

The MATH 1103 Final Exam consists of two parts. These pages contain Part I which consists of 35 multiple choice questions. They are printed on the front and the back of each page. A special answer sheet is provided so that your answers can be machine graded.

Part II consists of free response questions prepared by your instructor. You have three hours for the entire test.

- You must use a pencil with a soft black lead (#2 or HB) to enter your answers on the answer sheet.
- For each question choose the response which *best* fits the question.
- If you wish to change an answer, make sure that you completely erase your old answer and any other extraneous marks.
- There is no penalty for guessing. However if you mark more than one answer to a question, that question will be scored as incorrect.
- You may perform your calculations on the test itself or on scratch paper, but do not make any stray marks on the answer sheet.
- *Make sure that your name appears on the answer sheet and that you fill in the circles corresponding to your name.*
- *The use of a TI-89 or a TI-92 calculator on this test is a violation of the Code of Student Conduct.*

At the end of the examination you MUST hand in this booklet, your answer sheet and all scratch paper.

Final Exam

Math 1103, Spring 2011

1. Find the equation of the line that is parallel to $4x - y + 5 = 0$ and passes through the point $(-5,3)$
   a. $4x - y - 17 = 0$
   b. $4x - y - 5 = 0$
   c. $-4x + y - 5 = 0$
   d. $4x - y + 23 = 0$
   e. None of the above

2. Find the domain of the function $f(x) = \frac{2x+1}{x+3}$.
   a. $(-\infty, -3) \cup (-3, \infty)$
   b. $\left(-\infty, -\frac{1}{2}\right) \cup \left(-\frac{1}{2}, \infty\right)$
   c. $(-\infty, -3) \cup \left(-\frac{1}{2}, \infty\right)$
   d. $\left(-\infty, -\frac{1}{2}\right) \cup (-3, \infty)$
   e. $(-\infty, \infty)$

3. Which of the following functions is/are **odd**

I. $f(x) = 3$
II. $g(x) = x^3 + 3$
III. $h(x) = -x$

   a. I only
   b. II only
   c. III only
   d. II and III only
   e. I, II and III

4. Find the value of $f(3)$, if

$$f(x) = \begin{cases} 4 - x^2, & -2 \le x \le 2 \\ x - 5, & x > 2 \end{cases}$$

   a. -16
   b. 0
   c. -5
   d. -2
   e. 4

5. If $f(x) = x$ and $g(x) = \frac{1}{x}$, find $\left(\frac{f}{g}\right)(x)$.
   a. 1
   b. x^2

c. x

d. $\frac{1}{x}$

e. None of the above

6. Which of the following numbers is NOT a potential rational root of

$$f(x) = 18x^3 - 9x^2 - 5x + 2$$

a. $\frac{3}{2}$

b. $\frac{2}{9}$

c. 2

d. $\frac{1}{6}$

e. $-\frac{1}{2}$

7. The graph of $y = (x-4)^2 + 5$ can be obtained by the transformation of $g(x) = x^2$. Which of the following transformations must be used?

I. Move 5 units down.
II. Move 5 units up.
III. Move 4 units down.
IV. Move 4 units left
V. Move 4 units right.

a. V, then II
b. IV, then II
c. III, then I
d. II, then III
e. III, then II

8. Find the inverse function of $f(x) = 3^{x+2}$.

a. $f^{-1}(x) = \frac{1}{3^{x+2}}$
b. $f^{-1}(x) = -3^{x+2}$
c. $f^{-1}(x) = \log_3(x+2)$
d. $f^{-1}(x) = -2 + \log_3(x)$
e. None of the above

9. The vertex of the parabola given by the equation $f(x) = 3x^2 + 2x - 1$is

a. $(-\frac{1}{2}, -\frac{2}{3})$

b. (3,2)

c. $\left(-\frac{1}{3}, -1\right)$

d. $\left(-\frac{1}{3}, -\frac{4}{3}\right)$

e. None of the above

10. Find the horizontal asymptote (HA) and vertical asymptote (VA) of

$$f(x) = \frac{3x - 1}{2 - 3x}$$

a. HA: $y = -1$ VA: $x = \frac{2}{3}$

b. HA: $y = \frac{3}{2}$ VA: $x = \frac{1}{3}$

c. HA: $y = -1$ VA: $x = \frac{3}{2}$

d. HA: $y = 1$ VA: $x = \frac{2}{3}$

e. None of the above

11. If $f(x) = 1 - \frac{1}{x}$ and $g(x) = x - 1$, find $(g \circ f)(x)$

a. 1

b. x

c. $x + 1$

d. $\frac{1}{x}$

e. $-\frac{1}{x}$

12. Find the remainder when $f(x) = x^{88} + 5x - 2$ is divided by $(x + 1)$

a. -3

b. -4

c. -5

d. -6

e. None of the above

13. Solve the inequality $\frac{x-3}{2x-1} < 0$

a. $\left[\frac{1}{2}, 3\right]$

b. $\left(-\infty, \frac{1}{2}\right] \cup [3, \infty)$

c. $\left(-\infty, \frac{1}{2}\right) \cup (3, \infty)$

d. $(\frac{1}{2}, 3]$

e. $\left(\frac{1}{2}, 3\right)$

14. Which of the following is the horizontal asymptote to the exponential function $f(x) = -3^x + 2$
    a. $y = 0$
    b. $y = -3$
    c. $y = -1$
    d. $y = 2$
    e. $y = -2$

15. The domain of $f(x) = \log(3 - 2x) + 5$ is

    a. $(-\infty, \infty)$
    b. $(-\infty, 2)$
    c. $(-\infty, 1.5)$
    d. $(-\infty, 5)$
    e. None of the above

16. The solution to the equation$2 - 3\ln(x + 1) = 8$ is

    a. $-1 + e^{-2}$

    b. $\frac{e^8 - 2}{-3}$

    c. $e^{-8} - 1$

    d. e^{-3}

    e. None of the above

17. Solve the exponential equation

$$2^{x^2} = 4^x$$

    a. $x = 2,$
    b. $x = 0, x = 2$
    c. $x = 1$
    d. $x = 4, x = 2$
    e. $x = 0$

18. Use the change of base formula to find $\log_3(\pi)$ in base 10.

a. $\frac{\log(3)}{\log(\pi)}$

b. $\log(\pi/3)$

c. $\frac{\log(\pi)}{\log(3)}$

d. $\log(3/\pi)$

19. Find the accumulated amount if \$8000 is invested into an account that pays 8% interest compounded continuously for 5 years.

a. \$6885.66
b. \$8243.64
c. \$9290.51
d. \$9294.67
e. \$11934.60

20. Find the inverse of the function $f(x) = \sin(\frac{x}{5})$, where $-\frac{5}{2}\pi \leq x \leq \frac{5}{2}\pi$,

a. $f^{-1}(x) = \frac{1}{\sin(5x)}$

b. $f^{-1}(x) = \csc(5x)$

c. $f^{-1}(x) = \frac{1}{5}\sin^{-1}(x)$

d. $f^{-1}(x) = 5\sin^{-1}(x)$

e. $f^{-1}(x) = \sin^{-1}(\frac{1}{5x})$

21. A central angle measuring 45°is in a circle of radius 2 meters. Find the length of the arc of the circle subtended by the angle

a. 2 meters

b. 45 meters

c. 2π meters

d. π meters

e. $\frac{\pi}{2}$ meters

22. Find $\frac{f(1+h)-f(1)}{h}$ if $f(x) = x^2 + 1$

a. 1
b. 2

c. $2 + h$
d. $h^2 + 2h - 1$
e. h

23. Find the **exact** value of $csc(\frac{-5\pi}{4})$

a. $\frac{\sqrt{3}}{2}$

b. $\frac{\sqrt{2}}{2}$

c. $\sqrt{2}$

d. $-\sqrt{2}$

e. None of the above

24. Suppose that $\sin\theta = -\frac{2}{5}$ and θ is in Quadrant 4. Evaluate $\sec\theta$

a. $\frac{-2}{\sqrt{29}}$

b. $\frac{5}{\sqrt{21}}$

c. $\frac{\sqrt{29}}{2}$

d. $\frac{\sqrt{21}}{5}$

e. $-\frac{5}{\sqrt{21}}$

25. Use the appropriate sum or difference identity to find the exact value of $\cos(\frac{7\pi}{12})$

a. $\frac{\sqrt{2}-\sqrt{6}}{4}$

b. $\frac{\sqrt{2}+\sqrt{6}}{4}$

c. $\frac{\sqrt{6}-\sqrt{2}}{4}$

d. $\frac{\sqrt{6}+\sqrt{2}}{4}$

e. None of the above

26. Find $\cos(2\theta)$ if $\sin(\theta) = \frac{3}{5}$

a. 1

b. $\frac{7}{25}$

c. $-\frac{7}{25}$

d. $\frac{12}{25}$

e. $\frac{6}{5}$

27. The range of the function $f(x) = 5\sin[2(x+\frac{\pi}{3})] - 4$ is

a. $[-1,1]$
b. $[-\frac{\pi}{3},\frac{\pi}{3}]$
c. $[-1,9]$
d. $[-9,1]$
e. None of the above.

28. Find the angle co-terminal with $-\frac{22\pi}{3}$

a. $\frac{2\pi}{3}$

b. $-\frac{\pi}{3}$

c. $\frac{22\pi}{3}$

d. $-\frac{2\pi}{3}$

e. None of the above

29. Find the exact value of $cot^{-1}(1)$.

a. $-\frac{\pi}{4}$

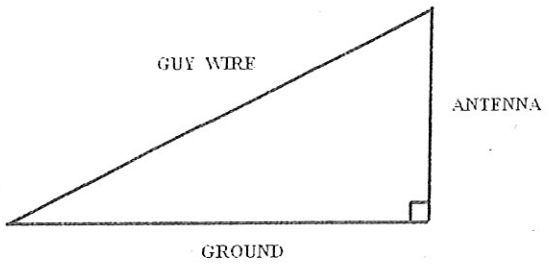
b. $\frac{\pi}{4}$

c. $\frac{3\pi}{4}$

d. $-\frac{3\pi}{4}$

e. None of the above.

30. A 79 foot guy wire is attached to the top of the 23 foot antenna and to a point on the ground. What angle does the guy wire make with the ground? See the figure below.



a. $21.54°$

b. $16.93°$

c. $30°$

d. $17.5°$

e. None of the above

31. Convert $210°$ to radians. Express your answer as a multiple of π.

a. $\frac{2\pi}{3}$

b. $-\frac{5\pi}{6}$

c. $\frac{6\pi}{7}$

d. $\frac{7\pi}{6}$

e. None of the above

32. The general solution of the equation $\cos(2\theta) = 1$ is

a. $k\pi$

b. 0

c. $2k\pi$

d. $\frac{\pi}{2} + 2k\pi$

e. $\frac{3\pi}{2} + 2k\pi$

33. $(\cos\alpha + \sin\alpha)^2$ equals to which of the following?

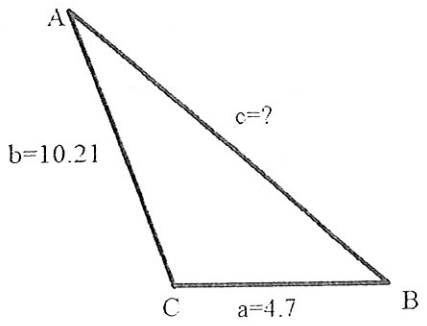
a. $1 - \cos(2\alpha)$

b. $1 + \cos(2\alpha)$

c. $1 - \sin(2\alpha)$

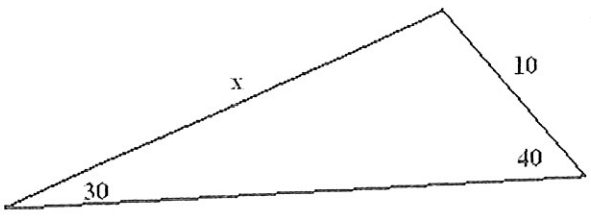
d. $1 + \sin(2\alpha)$
e. None of the above

34. Find the length of the side c in the triangle ABC where $a = 4.7, b = 10.21$ and $\angle ACB = 105.3°$



a. 20
b. 18.1
c. 15.2
d. 12.3
e. 11

35. Find the value of x in the following triangle. Round your answer to two decimal places.



a. 18.79
b. 16.10
c. 12.86
d. 8.39
e. 17.32