MATH 1100 Spring 2000
Common Final Exam May 6, 2000

Please print the following information:

Name: _____ Instructor: _____

Student ID #: _____ Section/Time: _____

This part of the exam consists of 30 multiple choice questions. As with many standardized tests, a special answer sheet is provided so that your answers can be computer graded. You must use a pencil with a soft black lead (#2 or HB) to complete the answer sheet. Be sure to completely fill in the space that corresponds to your answer choice. If you change your mind, completely erase any stray marks. (If you mark two or more answers corresponding to a single problem, then that problem is counted as incorrect.) YOU ARE NOT PENALIZED FOR GUESSING. You may perform calculations by writing on the test—not on the answer sheet. You will only receive credit for properly marking the answer sheet. MAKE SURE THAT YOUR NAME APPEARS ON THE ANSWER SHEET IN THE SPACES PROVIDED FOR THIS PURPOSE.

Questions begin on page 1 and are on the front and back of each page following this cover page.

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

1. Find all x which satisfy $3 - \frac{2}{x} - x = 0$

   a) $x = 2, \quad x = 1$

   b) $x = 0$

   c) $x = -2$, $x = -1$

   d) $x = -2$, $x = 1$

   e) $x = 2, \quad x = -1$

2. Find all x which satisfy $2(x-1) - 3[x - (2 - 3x)] = 4(x-1)$

   a) $x = -2$

   b) $x = \dfrac{7}{4}$

   c) $x = 3$

   d) $x = \dfrac{4}{7}$

   e) $x = 0$

3. Find all x which satisfy $2x^2 = 7x - 2$.

   a) $\dfrac{-7 + \sqrt{65}}{4}, \quad \dfrac{-7 - \sqrt{65}}{4}$

   b) $\dfrac{-7 + \sqrt{33}}{4}, \quad \dfrac{-7 - \sqrt{33}}{4}$

   c) $\dfrac{7 + \sqrt{65}}{4}, \quad \dfrac{7 - \sqrt{65}}{4}$

   d) $\dfrac{7 + \sqrt{33}}{4}, \quad \dfrac{7 - \sqrt{33}}{4}$

   e) No solution

4. Find all x which satisfy $-6 < 3 - 2x \leq 4$

   a) $\left(-\frac{1}{2}, \frac{9}{2}\right]$

   b) $\left[-\frac{1}{2}, \frac{9}{2}\right)$

   c) $\left(-\frac{1}{2}, \frac{9}{2}\right)$

   d) $\left(-\infty, -\frac{1}{2}\right)$

   e) $\left(-\infty, -\frac{1}{2}\right) \cup \left[\frac{9}{2}, +\infty\right)$

5. Solve for x: $x^2 + x - 12 < -6$

   a) $(-2, 3)$

   b) $(2, +\infty)$

   c) $(-\infty, -3)$

   d) $(-3, 2)$

   e) No solution

6. Solve for b in terms of c: $c = 2^b$.

   a) $b = \dfrac{c}{2}$

   b) $b = \dfrac{\ln c}{\ln 2}$

   c) $b = c^{1/2}$

   d) $b = 2^{1/c}$

   e) $b = c^2$

7. Solve for x: $\sqrt{3+x} = 3\sqrt{x}$

   a) $x = \dfrac{3}{8}$

   b) $x = 6$

   c) $x = \dfrac{8}{3}$

   d) $x = 0$

   e) $x = 1$

8. Factor $81x^2 - 25y^2$.

   a) $(81x - 25y)(81x + 25y)$

   b) $(9x + 5y)^2$

   c) $(9x - 5y)^2$

   d) $(9x + 5y)(9x - 5y)$

   e) The polynomial cannot be factored.

9. The graph of $y = (x-1)^2 + 3$ can be obtained by shifting the graph of $y = x^2$

   a) to the right by 3 and down 1

   b) to the left by 3 and up 1

   c) to the right by 1 and down 3

   d) to the right by 1 and up 3

   e) to the left by 1 and up 3

10. Find an equation of the line passing through the points $(-3, 4)$ and $(2, -5)$.

    a) $y - 5 = -\dfrac{9}{5}(x-2)$

    b) $y = x - 7$

    c) $y + 5 = -\dfrac{5}{9}(x-2)$

    d) $y = x + 7$

    e) $y + 5 = -\dfrac{9}{5}(x-2)$

11. Which of the following points are on the graph of $f(x) = x\sqrt{1-x^2}$?

$$P(0,0), \qquad Q(1,0), \qquad R(-1,0)$$

    a) P only

    b) P and Q only

    c) P, Q, and R are all on the graph.

    d) None of the points are on the graph.

12. $\left[(2xy+z)^2\right]^0 =$

    a) 0

    b) 1

    c) 2

    d) $4x^2y^2 + z^2$

    e) $4x^2y^2 + 4xyz + z^2$

13. Which of the following values is ***not*** in the domain of the function $g(x) = \sqrt{1-2x}$.

    a) 0

    b) -1

    c) 1

    d) $-1/2$

    e) All of these values are in the domain of g.

14. The point that lies exactly halfway between $(-3, 4)$ and $(4, -3)$ is:

    a) $(0, 0)$

    b) $(1/2,\ 1/2)$

    c) $(-1/2,\ -1/2)$

    d) $(-6, -6)$

    e) $(1, 1)$

15. The distance between the points $(-3, 4)$ and $(4, -3)$ is:

    a) $\sqrt{14}$

    b) $\sqrt{2}$

    c) $7\sqrt{2}$

    d) 5

    e) 7

16. Calculate the length of time that it takes for an investment of \$12,000 to grow to \$20,000 at an annual interest rate of 8% compounded quarterly (four times per year).

    a) 4.5 years

    b) 6.4 years

    c) 8.2 years

    d) 10.1 years

    e) 11.8 years

17. Find the smallest number which is a solution to the equation $2x^2 + x - 2 = 0$

    a) $-1 - \dfrac{\sqrt{17}}{4}$

    b) $\dfrac{-1 - \sqrt{17}}{4}$

    c) $-\dfrac{7}{4}$

    d) $\dfrac{-1 + \sqrt{17}}{4}$

    e) $\dfrac{-1 - \sqrt{-16}}{4}$

18. $\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right) =$

a) $x^2+\frac{1}{x^2}$

b) x^2-1

c) $x^2-\frac{1}{x^2}$

d) $x^2-\frac{2}{x}-\frac{1}{x^2}$

e) $x^2+\frac{2}{x}-\frac{1}{x^2}$

19. Solve for x:

$$\log_{10}(1-2x)=2.$$

a) $x=-\frac{99}{2}$

b) -9

c) $x=\frac{1-\log_{10}2}{2}$

d) $x=\frac{1-2^{10}}{2}$

e) $x=\frac{1}{2}-\frac{1}{\log_{10}}$

20. Solve for t: $e^{t^2} \cdot e^{-t} = 1$.

a) $t = 0$

b) $t = 1$

c) $t = \ln \frac{1}{2}$

d) $t = 0$ or $t = 1$

e) $t = \frac{1}{e}$

21. Find the vertical asymptote(s) for the graph of the function f given by the rule $f(x) = \frac{x}{x^2 + x - 2}$.

a) The line $x = -2$ and the line $x = 0$

b) The line $y = 2$ and the line $y = 1$

c) The line $x = 2$ and the line $y = -1$

d) The line $x = -2$ and the line $x = 1$

e) The line $y = -2$ and the line $y = 1$

22. For r a positive number, $\frac{r^{3/2} \cdot r^{-2/3}}{\sqrt{r}} =$

a) $r^{1/3}$

b) $r^{-3/2}$

c) $-r^{-1/3}$

d) $r^{-1/3}$

e) $\sqrt{r}$

23. $\dfrac{1}{x} + \dfrac{x}{x-1} =$

a) $\dfrac{x^2+x-1}{x^2-x}$

b) $\dfrac{1+x}{2x-1}$

c) $\dfrac{1}{x}$

d) $\dfrac{x^2+x-1}{x^2-1}$

e) $\dfrac{x+1}{x-1}$

24. Find all solutions of $2|x| + 1 = 5$.

a) $x = 2$

b) $x = -2$

c) $x = 4$

d) $x = \pm 2$

e) $x = \pm 1$

25. Given $f(x) = 2x^2 + 3$ and $g(x) = x - 2$, and $h(x) = g \circ f(x)$, we have $h(2) =$

a) 12

b) 3

c) 9

d) 0

e) -9

26. Given that the vertex for the graph of a certain quadratic function is $(3, 5)$ and that $(4, 7)$ is also a point on this graph, which of the following points must also be on the graph? (It might help to draw a rough sketch.)

    a) $(8, 6)$

    b) $(1, 2)$

    c) $(2, 7)$

    d) $(4, -7)$

    e) $(-4, 7)$

27. Determine which of the following responses completely describes the horizontal asymptote(s) for the graph

$$y = \frac{2x^4 + 100x^2 + 72}{3x^4 - 81x}.$$

    a) The line $y = \frac{2}{3}x$.

    b) This graph has no horizontal asymptotes.

    c) The lines $x = 0$ and $x = 3$.

    d) The line $x = \frac{2}{3}$.

    e) The line $y = \frac{2}{3}$.

28. Given that $\log_{10} u = v$, it follows that $\log_{10}(u^2) =$

a) $2v$

b) $2v - 1$

c) $v + 2$

d) $\sqrt{\log_{10} v}$

e) $\sqrt{v}$

29. The vertex for the graph $y = 2x^2 + x + 4$ is

a) $\left(-\frac{1}{4}, \frac{31}{8}\right)$

b) $x = -\frac{1}{4}$

c) $(0, 4)$

d) $(1, 6)$

e) a vertical line.

30. $\dfrac{\left(\frac{a}{b}\right)}{\left(\frac{b}{a^2}\right)} =$

a) $\frac{1}{a}$

b) $\frac{a^3}{b^2}$

c) a

d) $\frac{a}{b^2}$

e) $\frac{a}{b}$

END OF MULTIPLE CHOICE EXAM