

FINAL EXAM

Mathematics 1320/1420, Spring 2013

Group A

Name:

Follow the instructions given to you by your instructor. The test consists of 20 multiple choice problems and 4 problems to be worked out completely.

1. Solve the rational equation: $\frac{3x}{x-1} + 2 = \frac{3}{x-1}$
 - a) {1}
 - b) {1/3}
 - c) {-1}
 - d) No solution

2. Solve the linear equation: $(-5x + 4) - 5 = -4(x - 7)$
 - a) {29}
 - b) {19}
 - c) {-29}
 - d) {-6}

3. A car rental agency charges \$250 per week plus \$0.10 per mile to rent a car. The total cost, C , for the renting the car for one week and driving it x miles can be modeled by the formula; $C = 0.10x + 250$
How many miles can you travel in one week for \$330?
 - a) 3300 miles
 - b) 283 miles
 - c) 800 miles
 - d) 775 miles

4. Solve the equation using the quadratic formula:
$$3x^2 + x - 7 = 0$$
 - a) $\left\{ \frac{-1-\sqrt{85}}{2}, \frac{-1+\sqrt{85}}{2} \right\}$
 - b) $\left\{ \frac{1-\sqrt{85}}{6}, \frac{1+\sqrt{85}}{6} \right\}$
 - c) $\left\{ \frac{1-\sqrt{85}}{2}, \frac{1+\sqrt{85}}{2} \right\}$
 - d) $\left\{ \frac{-1-\sqrt{85}}{6}, \frac{-1+\sqrt{85}}{6} \right\}$

5. Determine whether the given quadratic function has a minimum value or maximum value. Then find the coordinates of the minimum or maximum point.

$$f(x) = x^2 - 2x - 6$$

- a) maximum; (-7,1)
 - b) maximum; (1,-7)
 - c) minimum; (-7,1)
 - d) minimum; (1,-7)
6. Solve the radical equation: $\sqrt{2x} + 8 = x + 4$
- a) {-4}
 - b) {-4, -4/3}
 - c) {2, 8}
 - d) {8}
7. Solve the absolute value inequality: $5 + \left|1 - \frac{x}{2}\right| \geq 8$
- a) $(-\infty, -8)$ or $[4, \infty)$
 - b) $[-4, 8]$
 - c) $[-8, 4]$
 - d) $(-\infty, -4]$ or $[8, \infty)$
8. Solve the rational inequality: $\frac{x-6}{x+8} < 0$
- a) $(6, \infty)$
 - b) $(-8, 6)$
 - c) $(-\infty, 8) \cup (6, \infty)$
 - d) $(-\infty, -8)$
9. Determine if the function is even, odd, or neither: $f(x) = 3x^5 + 4x^3$
- a) Even
 - b) Odd
 - c) Neither
10. Find the inverse function of the function: $f(x) = \sqrt{x+1}$
- a) $f^{-1}(x) = 1 - x^2$
 - b) $f^{-1}(x) = x + 1$
 - c) $f^{-1}(x) = x^2 - 1$
 - d) $f^{-1}(x) = (x + 1)^2$

11. Evaluate the piecewise function at $f(2)$:

$$f(x) = \begin{cases} 3x + 1 & \text{if } x < -1 \\ -2x - 5 & \text{if } x \geq -1 \end{cases}$$

- a) -9
- b) -3
- c) 7
- d) 7 and -9

12. For the given functions f and g , find the composition $(g \circ f)(x)$

$$f(x) = 4x^2 + 2x + 8 \quad g(x) = 2x - 6$$

- a) $4x^2 + 4x + 10$
- b) $4x^2 + 2x + 2$
- c) $8x^2 + 4x + 10$
- d) $8x^2 + 4x + 22$

13. Find the domain of $f(x) = \frac{x+5}{x^2-9x}$ expressed using interval notation

- a) $(-\infty, -5) \cup (-5, -3) \cup (-3, 3) \cup (3, \infty)$
- b) $(-\infty, 0) \cup (0, 9) \cup (9, \infty)$
- c) $(-\infty, \infty)$
- d) $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

14. The graph of $f(x) = (x + 1)^2 - 2$ is the graph of $g(x) = x^2$

- a) shifted left 1 unit and down 2 units
- b) shifted left 1 unit and up 2 units
- c) shifted right 1 unit and up 2 units
- d) shifted right 1 unit and down 2 units

15. Find the degree of the polynomial function: $f(x) = 8x^2 + 7x + 2x^3 + 28$

- a) 8
- b) 2
- c) 3
- d) 28

16. Write the equation in its equivalent exponential form:

$$\log_3 x = 2$$

a) $x^2 = 3$

b) $3^2 = x$

c) $3^x = 2$

d) $2^3 = x$

17. Solve the logarithmic equation: $\log_2 x + \log_2(x - 2) = \log_2 3$

a) $\{-1, 3\}$

b) $\{3\}$

c) $\{-1\}$

d) $\left\{\frac{5}{2}\right\}$

18. Solve the exponential equation. Express the solution set in terms of natural logarithms.

$$3^{x+7} = 4$$

a) $\{\ln 4 - \ln 3 - \ln 7\}$

b) $\left\{\frac{\ln 4}{\ln 3} - 7\right\}$

c) $\left\{\frac{\ln 3}{\ln 4} + 7\right\}$

d) $\left\{\frac{\ln 3}{\ln 4} + \ln 7\right\}$

19. Solve the system of linear equations:

$$\begin{cases} -x + y - z = -1 \\ x - y - z = 3 \\ x + y - z = 9 \end{cases}$$

a) no solution

b) $\{5, 3, -1\}$

c) $\{3, 5, -1\}$

d) $\{-1, 3, 5\}$

20. Evaluate: $\sum_{i=2}^4 \frac{(-1)^i}{i}$

a) $\left\{-\frac{7}{12}\right\}$

b) $\left\{-\frac{5}{12}\right\}$

c) $\left\{\frac{5}{12}\right\}$

d) $\left\{\frac{13}{15}\right\}$

21. You have 200 yards of fencing to enclose a rectangular region. Find the dimensions of the rectangle that maximize the enclosed area. What is the maximum area?
22. Claire has received scores of 85, 88, 87, and 90 on her algebra tests. What score must she receive on the fifth test to have an overall test score average of at least 87?
23. If \$10,000 is deposited in an account paying 4.5% compounded quarterly, how much will you have in the account in 3.5 years? Use the formula: $A = P\left(1 + \frac{r}{n}\right)^{nt}$
24. A drug has a half-life of 12 hours. If the initial dosage is 5 milligrams, how many milligrams will be in the patient's body in 16 hours? Use the formula: $A = A_0e^{kt}$