

The final examination will mainly include problems which are more or less similar in type and content. A few problems of other sorts may appear as well. This has been arranged as on a typical past final, so that you may know the approximate format, length, and level of difficulty to expect.

The actual final examination may include some problems which are suitable for MATH 115 but are not exactly like any of the problems here.

INSTRUCTIONS; READ AND FOLLOW THE FOLLOWING DIRECTIONS VERY CAREFULLY.

Do all work in this booklet. You must show your work for each problem to receive credit for it. All examples must be done algebraically. No credit will be given for answers obtained by trial and error. SIMPLIFY ALL ANSWERS.

1. Simplify: express all answers with positive exponents and evaluate (exactly) all numbers.

a) $(-7a^4bc^{-3})^3 =$

b) $\frac{-39x^{-7}y^{-5}}{3x^{-7}y^{-10}} =$

c) $\left(\frac{8}{27}\right)^{\frac{2}{3}} \cdot (2)^{-4} =$

d) $\sqrt{50a^6b^8c^5} =$

2. Compute and write answer in scientific notation.

$$\frac{(8.2 \times 10^{75})(9.1 \times 10^{-39})}{(4.1 \times 10^{57})}$$

3. Factor completely:

a) $11x^2 - 14xy + 3y^2 =$

b) $x^4 - 11x^2 + 28 =$

c) $27x^3 - 8y^3 =$

d) $x^3 - 2x^2 - 9x + 18 =$

4. Simplify:

a) $(4x + 5y)^2 - (2x + 5y)(8x + 5y) =$

- b) Rationalize the denominator and simplify:

$$\frac{5\sqrt{2} - \sqrt{10}}{5\sqrt{2} + \sqrt{10}}$$

5. Solve for x and check:

$$\frac{2x}{x-2} - \frac{5}{(x-2)(x+1)} = \frac{x}{x+1}$$

6. Solve the equation by quadratic formula:

$$5x^2 = 8x + 3$$

7. Solve for x . (Must be done algebraically. Trial and error is not acceptable.): $\sqrt{x+28} - \sqrt{x+1} = 3$

8. Find the center and radius of the circle:

$$x^2 + y^2 + 16x - 8y + 10 = 0$$

9. Find the slope, x -intercept and y -intercept of the line whose equation is:

$$2x - 3y - 12 = 0$$

10. Find the equation of the line that contains the point $(-4, -5)$ and is perpendicular to the line whose equation is:

$$2x + y = -4$$

11. Let $f(x) = 3x^2 - 6$ and $g(x) = 2x - 5$

a) Find $(f - g)(x)$

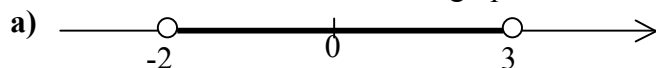
b) Find $(fg)(x)$

12. Let $f(x) = x^3 - 14$ and $g(x) = \sqrt{x+5}$

a) Find $(f \circ g)(x) =$

b) Find $(g \circ f)(x) =$

13. Write interval notation for the graph:



b) Write interval notation for $\{x|x \leq -3\}$

c) Write set notation for $[-4, 3)$

14. Determine the vertex of

a) $f(x) = -2x^2 - 16x + 27$

Sketch the graph. Label the vertex and 2 other points.

b) Is there a maximum or minimum function value? State it.

c) Give the equation of the line of symmetry

d) Find i) the y -intercept ii) any x -intercepts

15. Find the domain and express answer in interval notation.

a) $f(x) = \sqrt{42 - 6x}$

b) $g(x) = \frac{1}{x^2 - 3x - 40}$

16. Solve the linear system:

$$2x - 3y = 29$$

$$4x + 2y = 18$$

PART B.

DO THREE OF THE FOLLOWING WORD PROBLEMS. *The word problems must be solved algebraically. You must indicate clearly the variables and equations you use in solving each problem to receive credit for it. Trial and error is not an acceptable method and no credit will be given.*

17. On a particular day, the campus bookstore sold 30 T-shirts. White ones cost \$9.95 and yellow ones cost \$10.50. Total sales of T-shirts were \$310.60. How many of each color were sold?
18. A working alone can paint a room in 3.15hours. A and B working together can paint the room in 2.09hours. How long would it take B working alone to paint the room?
19. Solution A is 6% peroxide and solution B is 2% peroxide. How many quarts of each should be mixed to obtain 50 quarts of solution, which is 3.2% peroxide?
20. An airplane leaves Louisville for Cleveland at a speed of 475mph. Twenty minutes later; a plane heading for Louisville leaves Cleveland, which is 350 miles from Louisville at a speed of 500mph. When they meet, how far are they from Cleveland?
21. A rancher wants to enclose a rectangular area by using 120yd of fencing. To save material, he will use the river as on boundary of the enclosure. What dimensions of the rectangle will maximize its area? What is the maximum area?