

Math 083 Final Exam Practice**Name:** _____

1. Simplify the expression. Remember, negative exponents give reciprocals. $16^{\frac{1}{2}}$
2. Combine the expressions. $\sqrt{128} - \sqrt{512} - \sqrt{8}$
3. Write the expression in simplified form. (Assume the variables are nonnegative numbers.)
 $\sqrt{20x^3}$
4. State the domain for the rational function. $f(x) = \frac{x-5}{x-3}$
5. Choose the answer that shows the equation in logarithmic form. $8^2 = 64$
6. Combine the expressions. (Assume the variables are nonnegative numbers.)
 $x^4\sqrt[4]{3xy^8} + y^4\sqrt[4]{243x^5y^4} + y^2\sqrt[4]{48x^5}$
7. Multiply. (Assume all expressions appearing under a square root symbol represent nonnegative numbers.)
 $(\sqrt{x} + 3)(\sqrt{x} + 4)$
8. Given $f(x) = x^2 - 6x - 7$ and $g(x) = x - 3$, find the following. $(f - g)(2)$
9. Factor the expression as the sum or difference of two cubes. $125 - 8a^3$
10. A company finds that it can make a profit of P dollars each month by selling x patterns, according to the formula $P(x) = -0.001x^2 + 5.5x - 5,100$.

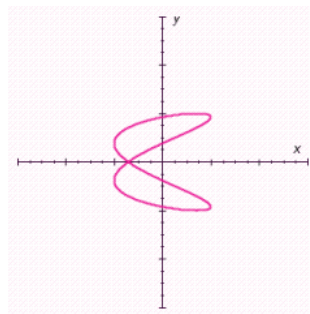
How many patterns must the company sell each month to have a maximum profit?
What is the maximum profit?
11. Solve the equation. $(2y - 7)^2 = 9$

12. Rationalize the denominator in the following expression. $\sqrt[4]{\frac{5}{3x^2}}$
13. For the following equation, find the x-intercepts and the coordinates of the vertex, and choose the corresponding graph. $y = -x^2 + 25$
14. Let $f(x) = 3x - 5$ and $g(x) = 5x^2 + 1$. Find the function $f + g$.
15. Rationalize the denominator in the following expression. (Assume all expressions appearing under a square root symbol represent nonnegative numbers.) $\frac{2\sqrt{x} - 1}{5 + \sqrt{x}}$
16. Multiply. $(\sqrt{5} - 3\sqrt{3})(4\sqrt{5} - 6\sqrt{3})$
17. Write the expression in simplified form. $\sqrt{8}$
18. Combine the rational expressions. Reduce your answer to lowest terms.

$$\frac{8a}{a^2 + 10a + 9} - \frac{7a}{a^2 + 9a + 8}$$
19. For the following equation, find the x-intercepts and the coordinates of the vertex, and choose the corresponding graph. $y = 3x^2 - 12x - 15$
20. Write the expression in simplified form. (Assume the variables are nonnegative numbers.)

$$\sqrt[3]{54a^2b^3c^4}$$
21. Perform the indicated operations. Reduce your answer to lowest terms. $\frac{5ab^3}{6a^2b} \div \frac{10a^8b^2}{12ab^9}$
22. Solve the following quadratic equation by completing the square. $a^2 + 10a + 18 = 0$
23. Solve the equation. $x^2 + 45 = 0$

24. Does the graph represent a function?



25. Solve the equation. Use factoring or the quadratic formula, whichever is appropriate. (Try factoring first. If you have any difficulty factoring, then go right to the quadratic formula.)
 $100x^2 - 200x + 100 = 0$

26. Solve the equation. $\frac{3}{y-4} - \frac{2}{y+1} = \frac{7}{y^2 - 3y - 4}$

27. Solve the equation. $10 - \frac{8}{x^2} = \frac{11}{x}$

28. Find the product. $(2 - 6i)(4 + i)$

29. Let $f(x) = 3^x$ and $g(x) = \left(\frac{1}{2}\right)^x$, evaluate $f(2) + g(-2)$.

30. Solve the equation. Use factoring or the quadratic formula, whichever is appropriate. (Try factoring first. If you have any difficulty factoring, then go right to the quadratic formula.)
 $2x - 15 = 3x^2$

31. Find the coordinates of the vertex, and indicate whether the vertex is the highest point on the graph or the lowest point on the graph. $y = x^2 - 10x - 3$

32. Write the number in terms of i , and simplify as much as possible. $-\sqrt{-12}$

33. Rationalize the denominator in the following expression. $\frac{9}{\sqrt{7}}$

34. Reduce to lowest terms. $\frac{16 - a^2}{a^2 - 8a + 16}$

35. Combine the complex numbers. $(7 + 6i) + (1 + 3i)$

36. Use the definition of rational exponents to write the following with the appropriate root. Then simplify.

$$\left(\frac{64}{9}\right)^{\frac{1}{2}}$$

37. Find the quotient. Write the answer in standard form for complex numbers. $\frac{1 - 3i}{1 + 3i}$

38. Choose the answer that shows the equation in exponential form. $\log_{10} 0.00001 = -5$

39. Perform the indicated operations. Reduce your answer to lowest terms.

$$\frac{2x^2 - 3x - 20}{4x^2 + 12x + 5} \div \frac{x^2 - 16}{2x^2 + 15x + 7}$$

40. Find the product. $2i(3 + 4i)$

41. Solve the equation for x . $\log_x 25 = 2$

42. Solve the equation. $\sqrt{2x + 9} - 2 = 3$

43. Let $g(x) = x^2 + 4x + 6$. Evaluate $g(-3)$.

44. Let $f(x) = 4^x$ and $g(x) = \left(\frac{1}{2}\right)^x$, evaluate $f(1) - g(-1)$.

45. Factor completely. If the given polynomial is not factorable, indicate so by writing *prime*.
 $45a^2 - 245$

46. For the equation, find the coordinates of the vertex, and indicate whether the vertex is the highest point on the graph or the lowest point on the graph. (Do not graph.) $y = -x^2 - 6x$

Vertex = _____ The vertex is the _____ point on the graph.

47. Solve the equation. $x^2 - 10x + 25 = -8$

48. Factor completely. Be sure to factor out the greatest common factor first. If factoring is impossible, write *prime*. $3x^2 - 26x + 16$

49. Solve the following quadratic equation by completing the square. $a^2 - 8a + 17 = 0$

50. Solve the equation. $x^3 + 7x^2 + 10x = 0$

51. Solve the equation using the quadratic formula. $5x^2 - 10x + 5 = 0$

52. Let $f(x) = 2^x$. Evaluate $f(-1)$.

53. Simplify as much as possible. i^{19}

54. Solve the equation. $(x + 4)^2 = 25x$

55. Find the quotient. Write the answer in standard form for complex numbers. $\frac{(7 + 3i)}{i}$

56. Rationalize the denominator in the following: $\frac{\sqrt{5}}{2\sqrt{5} - 3}$

57. Find the product. $(3 - 3i)^2$

58. Factor completely by first factoring out the greatest common factor and then factoring the trinomial that remains. $2a^2 + 2a - 4$

59. Solve the equation for x. $\log_x 27 = 3$

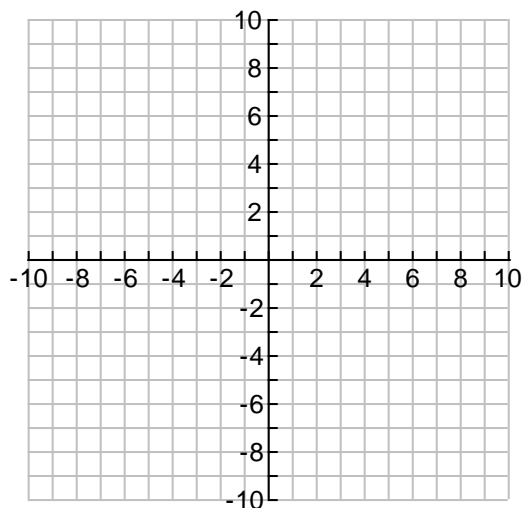
60. Solve the equation. $y^2 = \frac{5}{9}$

61. Consider the circle $(x + 2)^2 + (y - 1)^2 = 16$

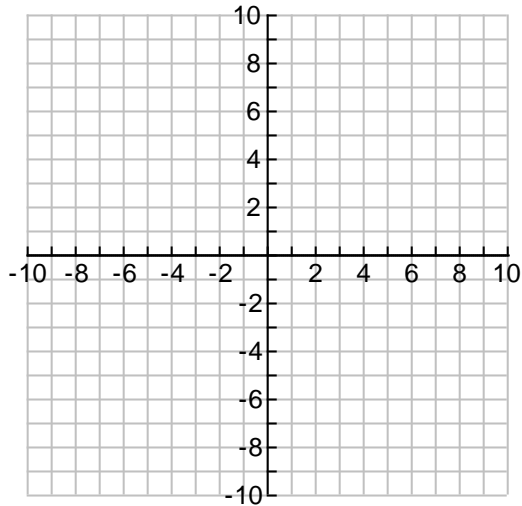
a. Determine the radius of the circle.

b. Determine the center of the circle.

c. Use the results of parts a and b to sketch the circle $(x + 2)^2 + (y - 1)^2 = 16$



62. Consider the circle $x^2 + (y+3)^2 = 6$.
- Determine the radius of the circle.
 - Determine the center of the circle.
 - Use the results of parts a and b to sketch the circle $x^2 + (y+3)^2 = 6$.



Math 083 Final Exam Practice Answer Section

1. $\frac{1}{64}$

2. $-10\sqrt{2}$

3. $2x\sqrt{5x}$

4. $\{x \mid x \neq 3\}$

5. $\log_8 64 = 2$

6. $6xy^2 \sqrt[4]{3x}$

7. $x + 7\sqrt{x} + 12$

8. $(f - g)(2) = -14$

9. $(5 - 2a)(25 + 10a + 4a^2)$

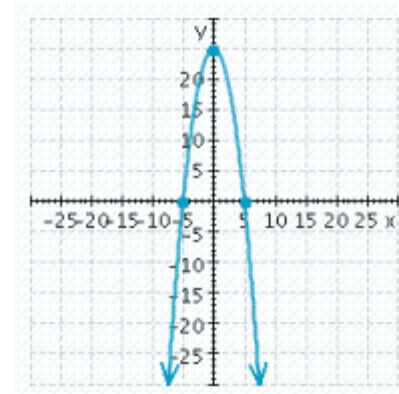
10. Patterns = 2,750;
Maximum Profit =
\$2,462.50

11. $y = 2, 5$

12. $\frac{\sqrt[4]{135x^2}}{3x}$

13.

x-intercepts = -5, 5; vertex =
(0, 25)



14. $5x^2 + 3x - 4$

15. $\frac{11\sqrt{x} - 2x - 5}{25 - x}$

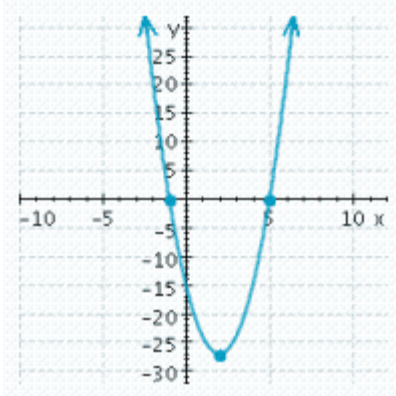
16. $74 - 18\sqrt{15}$

17. $2\sqrt{2}$

18. $\frac{a}{(a+9)(a+8)}$

19.

x-intercepts = -1, 5; vertex = (2, -27)



20. $3bc\sqrt[3]{2a^2c}$

21. $\frac{b^9}{a^8}$

22. $a = -5 \pm \sqrt{7}$

23. $x = \pm 3i\sqrt{5}$

24. no

25. $x = 1$

26. $y = -4$

27. $x = -\frac{1}{2}, \frac{8}{5}$

28. $14 - 22i$

29. $f(2) + g(-2) = 13$

30. $x = \frac{1 \pm 2i\sqrt{11}}{3}$

31. vertex = (5, -28); it is the lowest point.

32. $-2i\sqrt{3}$

33. $\frac{9\sqrt{7}}{7}$

34. $-\frac{a+4}{a-4}$

35. $8 + 9i$

36. $\frac{8}{3}$

37. $-\frac{4}{5} - \frac{3}{5}i$

38. $10^{-5} = 0.00001$

39. $\frac{x+7}{x+4}$

40. $-8 + 6i$

41. $x = 5$

42. $x = 8$

43. 3

44. 2

45. $5(3a+7)(3a-7)$

46. $(-3, 9)$; highest

47. $5 - 2i\sqrt{2}, 5 + 2i\sqrt{2}$

48. $(3x-2)(x-8)$

49. $4+i, 4-i$

50. $0, -5, -2$

51. $1 \pm 3i$

52. $\frac{1}{2}$

53. $-i$

54. 1, 16

55. $3 - 7i$

56. $\frac{10+3\sqrt{5}}{11}$

57. $-18i$

58. $2(a+2)(a-1)$

59. $x=3$

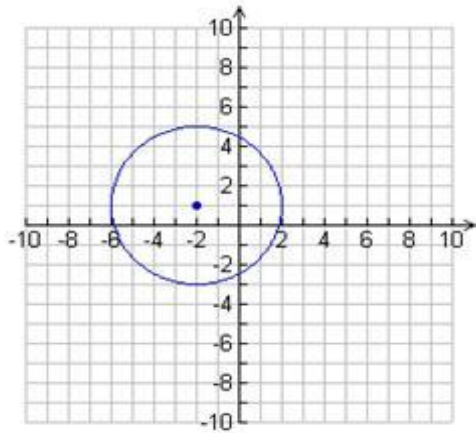
60. $\frac{\sqrt{5}}{3}, -\frac{\sqrt{5}}{3}$

61.

a. $r = 4$

b. center = $(-2, 1)$

c.



62.

a. $r = \sqrt{6}$

b. center = $(0, -3)$

c.

