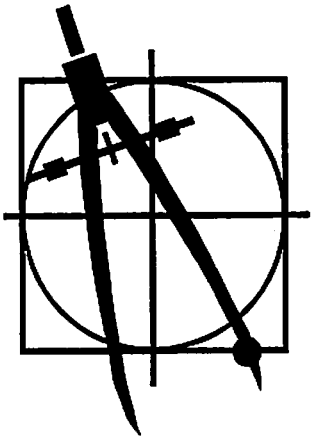


Math Department
Final Exam Math 125

Do NOT write in booklet.
Do all work on scratch paper. Put answers on scantron. NO CELL PHONES ALLOWED.

Good Luck

Version B **TEST#:_____**

Directions: DO NOT WRITE ON THIS EXAM. USE THE SCRATCH PAPER PROVIVED. Translate your answers to the SCANTRON form for all problems 1-40. **Good luck!** You have 2 HOURS to complete this exam.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the rules of exponents to simplify the expression. Write the answer with positive exponents. Assume that all variables represent positive real numbers.

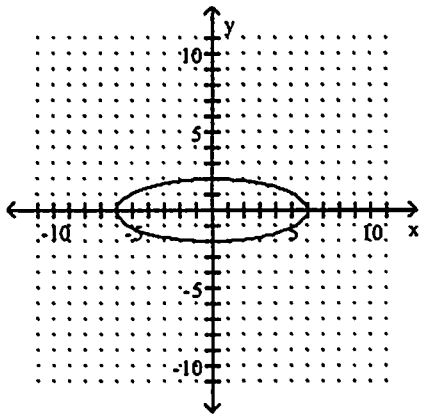
1) $\dfrac{x^{1/2}}{x^{5/4} \cdot x^{-2}}$ 1) _____

A) $x^{15/4}$ B) $\dfrac{1}{x^{15/4}}$ C) $x^{5/4}$ D) $\dfrac{1}{x^{5/4}}$

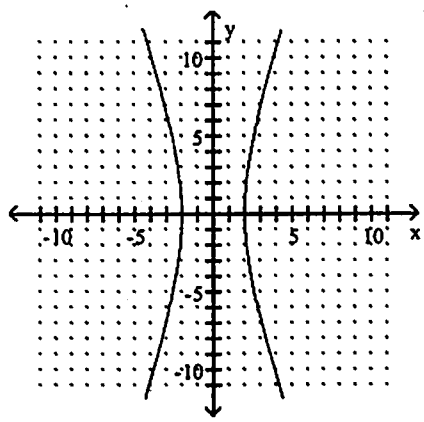
Match the equation with its graph.

2) $\dfrac{x^2}{36} + \dfrac{y^2}{4} = 1$ 2) _____

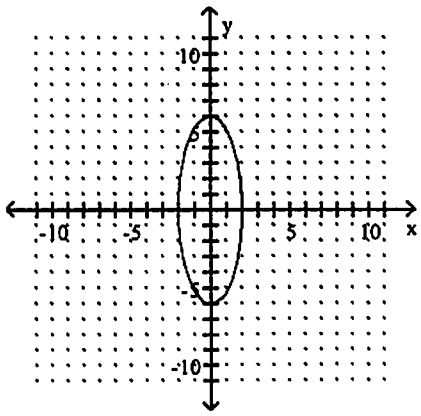
A)



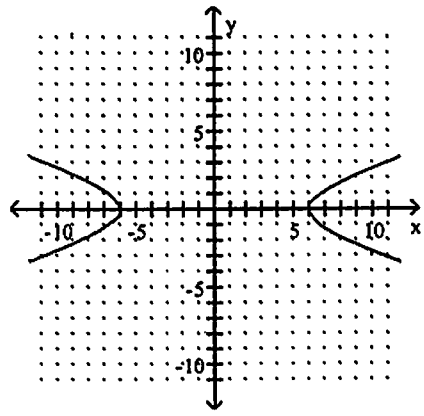
B)



C)



D)



Find the center and radius of the circle.

3) $x^2 + y^2 + 2x - 4y - 44 = 0$ 3) _____

A) $(-2, 1)$; $r = 49$ B) $(-1, 2)$; $r = 7$ C) $(1, -2)$; $r = 49$ D) $(2, -1)$; $r = 7$

Find the indicated value.

4) Let $f(x) = 3^x$. Find $f^{-1}(9)$ 4) _____

A) $\frac{2}{3}$ B) 3 C) 2 D) $\frac{1}{3}$

Solve the exponential equation.

5) $2^{(7+3x)} = \frac{1}{4}$ 5) _____

A) $\{4\}$ B) $\{3\}$ C) $\{-3\}$ D) $\left\{\frac{1}{2}\right\}$

Solve the problem.

6) The function $f(x) = 1 + 1.5 \ln (x+1)$ models the average number of free-throws a basketball player can make consecutively during practice as a function of time, where x is the number of consecutive days the basketball player has practiced for two hours. After 27 straight days of practice, what is the average number of consecutive free throws the basketball player makes? 6) _____

A) 9 consecutive free throws B) 7 consecutive free throws

C) 6 consecutive free throws D) 10 consecutive free throws

For the given functions f and g , find the indicated composition.

7) $f(x) = 4x^2 + 3x + 5$, $g(x) = 3x - 4$ 7) _____

$(g \circ f)(x)$

A) $4x^2 + 3x + 1$ B) $12x^2 + 9x + 19$ C) $12x^2 + 9x + 11$ D) $4x^2 + 9x + 11$

Use properties of logarithms to expand the logarithmic expression as much as possible.

8) $\log_{13} \frac{5\sqrt{r}}{s}$ 8) _____

A) $\log_{13} 5 + \frac{1}{2} \log_{13} r - \log_{13} s$ B) $\log_{13} (5\sqrt{r}) - \log_{13} s$

C) $\log_{13} 5 \cdot \frac{1}{2} \log_{13} m \div \log_{13} s$ D) $\log_{13} s - \log_{13} 5 - \frac{1}{2} \log_{13} r$

Solve the equation. Use a calculator where appropriate. If the answer is irrational, round to the nearest hundredth.

9) $\log_3 (15 - 3x) = 2$ 9) _____

A) $\frac{1}{2}$ B) 2 C) $-\frac{1}{2}$ D) -2

Evaluate.

10) $\log_{11} 11 + \log_{11} 1$ 10) _____

A) 11 B) 12 C) 1 D) 10

Solve the problem.

11) Luis invests \$1000 into an account earning interest at a rate of 10% compounded annually. Find the amount in the account at the end of 7 years. 11) _____

A) \$1948.72 B) \$1771.56 C) \$948.72 D) \$2143.59

Simplify. Assume that all variables represent positive real numbers.

12) $\sqrt[3]{\frac{7}{9x^2}}$ 12) _____

A) $\frac{\sqrt[3]{63x}}{9x}$ B) $\frac{\sqrt[3]{567x}}{81}$ C) $\frac{\sqrt[3]{567x^2}}{9x}$ D) $\frac{\sqrt[3]{21x}}{3x}$

Solve the problem.

13) When the temperature stays the same, the volume of a gas is inversely proportional to the pressure of the gas. If a balloon is filled with 48 cubic inches of a gas at a pressure of 14 pounds per square inch, find the new pressure of the gas if the volume is decreased to 16 cubic inches. 13) _____

A) 39 lb/in.^{2} B) 42 lb/in.^{2} C) $\frac{8}{7}$ lb/in.^{2} D) 28 lb/in.^{2}

Answer the question asked. When necessary, round to the nearest hundredth.

14) Mark and Rachel both work for Smith Landscaping Company. Mark can finish a planting job in 4 hours, while it takes Rachel 5 hours to finish the same job. If Mark and Rachel will work together on the job, and the cost of labor is $50 per hour, what should the labor estimate be? (Round to the nearest cent, if necessary.) 14) _____

A) $111.11 B) $222.22 C) $225.00 D) $22.50

Solve the equation.

15) $(3x - 7)^2 + 5(3x - 7) + 6 = 0$ 15) _____

A) $\frac{5}{3}, \frac{4}{3}$ B) $-\frac{4}{3}, -\frac{5}{3}$ C) $-\frac{9}{7}, \frac{10}{3}$ D) $-\frac{10}{3}, \frac{9}{3}$

Decide what number must be added to make the expression a perfect square trinomial.

16) $p^2 + 11p +$ ___ 16) _____

A) $\frac{11}{2}$ B) $\frac{121}{4}$ C) 22 D) 484

Solve the given equation by completing the square.

17) $p^2 + 3p - 9 = 0$ 17) _____

A) $\left\{\frac{-3 - 3\sqrt{5}}{2}\right\}$ B) $\{-3 + 3\sqrt{5}, -3 - 3\sqrt{5}\}$

C) $\left\{\frac{-3 + 3\sqrt{5}}{2}, \frac{-3 - 3\sqrt{5}}{2}\right\}$ D) $\left\{\frac{3 + 3\sqrt{5}}{2}\right\}$

Provide an appropriate response.

18) Which one of the following methods cannot be used to solve the equation $x^2 - 4x - 4 = 0$? 18) _____

A) Factoring B) All of the methods can be used.

C) Completing the square D) Quadratic formula

Multiply.

19) $(6 + 5i)^2$ 19) _____

A) 61 - 60i B) 61 + 60i C) 11 - 60i D) 11 + 60i

Rationalize the denominator. Assume that all variables represent positive real numbers and that the denominator is not zero.

20) $\frac{7-\sqrt{2}}{7+\sqrt{2}}$ 20) _____

A) -1 B) $\frac{51-14\sqrt{2}}{47}$ C) $\frac{51+14\sqrt{2}}{47}$ D) $\frac{47-14\sqrt{2}}{51}$

Add or subtract.

21) $\frac{10}{x^2+5x}+\frac{8}{x}+\frac{2}{x+5}$ 21) _____

A) $\frac{8}{x}$ B) $\frac{16}{x}$ C) $\frac{2}{x}$ D) $\frac{10}{x}$

22) $\frac{4x^2+17x+23}{x^2+10x+24}-\frac{3x^2+8x+5}{x^2+10x+24}$ 22) _____

A) $\frac{x^2+9x+18}{x^2+10x+24}$ B) $\frac{x+3}{x+4}$ C) $\frac{x+3}{x-4}$ D) $\frac{x-3}{x+4}$

Factor the polynomial completely.

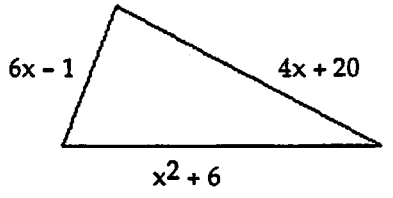
23) $10x^3-360x$ 23) _____

A) $10x(x+6)(x-6)$ B) $x(x+6)(10x-60)$

C) $10(x+6)(x^2-6x)$ D) prime

Find an expression, in factored form, for the perimeter of the figure.

24) 24) _____



A) $(x+6)(x+4)$ B) $(x+5)^2$ C) $(x+4)^2$ D) $(x+5)(x-5)$

Find the x-intercepts of the parabolic function.

25) $y=5x^2-35x+50$ 25) _____

A) (2, 0), (5, 0) B) (5, 0), (2, 0), (5, 0)

C) (0, 0), (2, 0), (5, 0) D) (-2, 0), (-5, 0)

Factor the polynomial completely.

26) $x^3-\frac{1}{27}$ 26) _____

A) $\left(x-\frac{1}{3}\right)\left(x^2+\frac{1}{3}x+\frac{1}{9}\right)$ B) $\left(x+\frac{1}{3}\right)\left(x^2-\frac{1}{3}x+\frac{1}{9}\right)$

C) $\left(x+\frac{1}{3}\right)\left(x^2-\frac{1}{9}x+\frac{1}{27}\right)$ D) $\left(x-\frac{1}{3}\right)\left(x^2+\frac{1}{9}x+\frac{1}{27}\right)$

Divide using synthetic division.

27) $\frac{x^5 + x^3 - 3}{x - 2}$ 27) _____

A) $x^4 + 3 + \frac{3}{x - 2}$

B) $x^4 + 2x^3 + 5x^2 + 10x + 20 + \frac{37}{x - 2}$

C) $x^4 + 2x^3 + 4x^2 + 9x + 18 + \frac{33}{x - 2}$

D) $x^4 + 3x^2 + \frac{3}{x - 2}$

Multiply the polynomials.

28) $(x - 12)(x^2 + 5x - 3)$ 28) _____

A) $x^3 + 17x^2 + 57x - 36$

B) $x^3 - 7x^2 - 63x + 36$

C) $x^3 - 7x^2 - 57x - 36$

D) $x^3 + 17x^2 + 63x + 36$

Solve the problem.

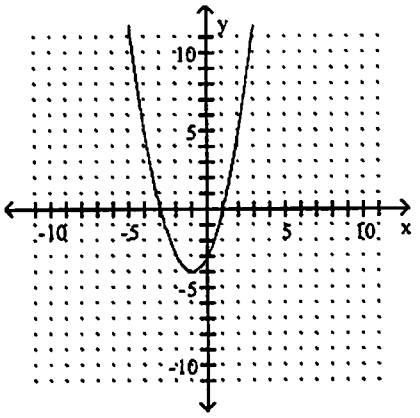
29) A twin-engined aircraft can fly 1280 miles from city A to city B in 5 hours with the wind and make the return trip in 8 hours against the wind. What is the speed of the wind? 29) _____

A) 64 mph B) 32 mph C) 48 mph D) 80 mph

Graph the function. Identify the vertex, x-intercepts, and the equation for the axis of symmetry.

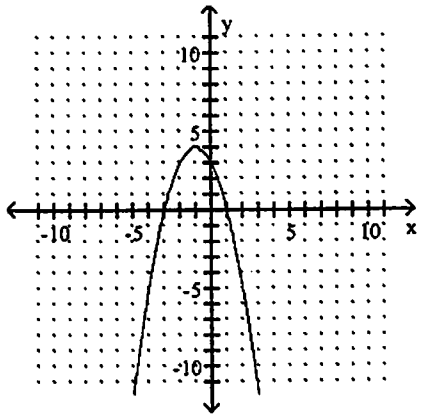
30) $f(x) = -(x - 1)^2 + 4$ 30) _____

A)



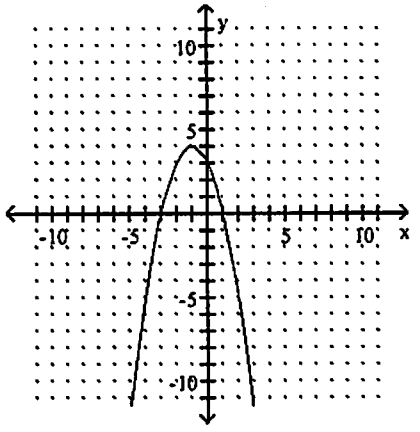
vertex: (- 1, - 4)
x-intercepts: (-3, 0) and (1, 0)
axis of symmetry: x = - 1

B)



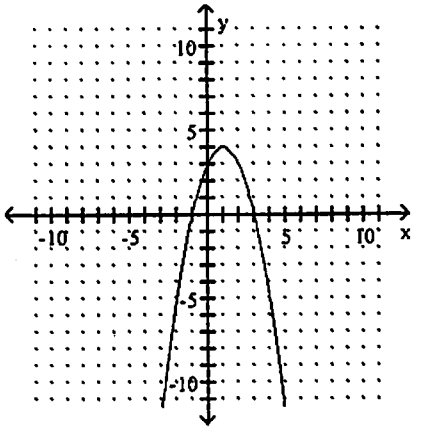
vertex: (- 1, 4)
x-intercepts: (-1, 0) and (3, 0)
axis of symmetry: x = - 1

C)



vertex: (- 1, 4)
x-intercepts: (-3, 0) and (1, 0)
axis of symmetry: x = - 1

D)



vertex: (1, 4)
x-intercepts: (-1, 0) and (3, 0)
axis of symmetry: x = 1

Solve.

31) $|4x - 6| = 3$ 31) _____

A) $\left\{-\frac{9}{4}, -\frac{3}{4}\right\}$ B) $\left\{\frac{1}{6}, \frac{7}{6}\right\}$ C) $\left\{\frac{3}{4}, \frac{9}{4}\right\}$ D) $\left\{-\frac{7}{6}, -\frac{1}{6}\right\}$

Evaluate the determinant.

32) $\begin{vmatrix} 1 & 3 & 4 \\ -2 & 0 & 1 \\ 4 & 0 & 4 \end{vmatrix}$ 32) _____

A) 36 B) -12 C) 12 D) -36

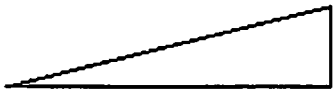
Find an equation of the line containing the given pair of points. Write your final answer in slope-intercept form.

33) (-5, 0) and (2, 6) 33) _____

A) $y = \frac{6}{7}x + \frac{30}{7}$ B) $y = -\frac{6}{7}x + \frac{30}{7}$ C) $y = \frac{5}{7}x + \frac{30}{7}$ D) $y = -\frac{5}{7}x + \frac{30}{7}$

Solve the problem.

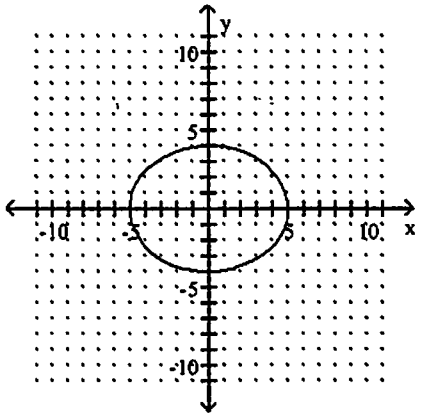
34) A motorcycle daredevil is planning a stunt to perform at a county fair. A ramp must be built to give him a 20% grade, or slope. If the vertical height at the end of the ramp must be 14 ft to assure that the stunt is a success, what must be the length of the horizontal run? 34) _____



A) 70 ft B) 252 ft C) 2.52 ft D) 14 ft

Determine whether the graph illustrated represents a function. Give the domain and range of the relation or function.

35) 35) _____



A) function
domain: {x | -5 ≤ x ≤ 5}
range: {y | -4 ≤ y ≤ 4}

B) not a function
domain: {x | -5 ≤ x ≤ 5}
range: {y | -4 ≤ y ≤ 4}

C) not a function
domain: {y | -4 ≤ y ≤ 4}
range: {x | -5 ≤ x ≤ 5}

D) function
domain: {y | -4 ≤ y ≤ 4}
range: {x | -5 ≤ x ≤ 5}

Solve the given equation or inequality. If an equation is given, then write the solution set in set notation. If an inequality is given, then write the solution set in interval notation.

36) $|h - 9| + 4 \leq 9$ 36) _____

A) $(-\infty, 14]$ B) [4, 9] C) (4, 14) D) [4, 14]

Solve the rational equation.

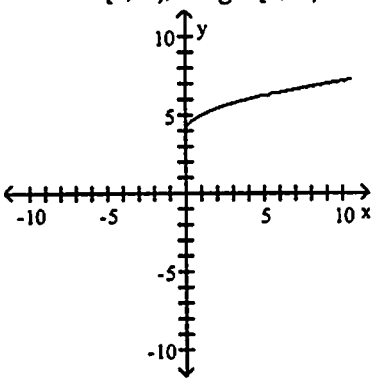
37) $\frac{5}{x-7} + \frac{3}{x} = \frac{-21}{x^2 - 7x}$ 37) _____

A) {0, 7} B) no solution C) {-7} D) {0}

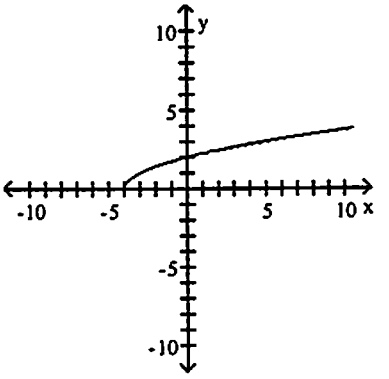
Graph the function and give its domain and range.

38) $f(x) = \sqrt{x - 4}$ 38) _____

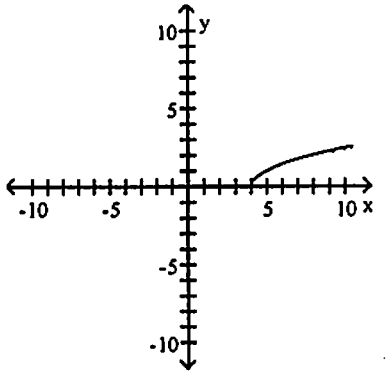
A) domain: [0, ∞); range: [4, ∞)



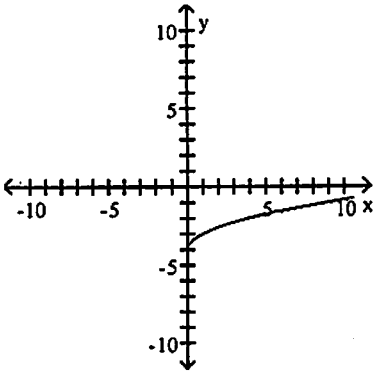
B) domain: [−4, ∞); range: [0, ∞)



C) domain: [4, ∞); range: [0, ∞)



D) domain: [0, ∞); range: [−4, ∞)



Use the binomial theorem to expand the expression.

39) $(2x - 1)^5$ 39) _____

A) $32x^5 + 10x^4 - 40x^3 - 40x^2 + 10x - 1$

B) $32x^5 - 1$

C) $32x^5 - 80x^4 + 80x^3 - 40x^2 + 10x - 1$

D) $32x^5 - 16x^4 + 8x^3 - 4x^2 + 2x - 1$

Solve the system of equations using the addition method.

40) $x + y = -5$
$2x - 4y - 5z = -11$
$x - z = -6$ 40) _____

A) (5, −1, −4) B) (−1, 5, −4) C) (5, −4, −1) D) (−1, −4, 5)

Answer Key
Testname: MATH125 FINAL OK FALL2010

1) C
2) A
3) B
4) C
5) C
6) C
7) C
8) A
9) B
10) C
11) A
12) D
13) B
14) A
15) A
16) B
17) C
18) A
19) D
20) B
21) D
22) B
23) A
24) B
25) A
26) A
27) B
28) B
29) C
30) D
31) C
32) A
33) A
34) A
35) B
36) D
37) B
38) C
39) C
40) D