Math 1010
Final Exam
Version B
Fall Semester, 2004

Name: _____

ID Verification: _____

MULTIPLE CHOICE. Circle the correct answer.

Factor completely.

1) $8x^2 - 6x - 9$

A) $(8x + 3)(x - 3)$

B) $(4x - 3)(2x + 3)$

C) $(4x + 3)(2x - 3)$

D) prime polynomial

E) None of the above

Find the distance between the pair of points.

2) $(3, 6)$ and $(-1, -1)$

A) 28 units

B) 65 units

C) $\sqrt{33}$ units

D) $\sqrt{65}$ units

E) None of the above

Find the center and the radius of the circle.

3) $x^2 + y^2 + 2x - 8y + 9 = 0$

A) center $(-1, 4)$, radius = 8

B) center $(-1, 4)$, radius = $2\sqrt{2}$

C) center $(1, -4)$, radius = 8

D) center $(1, -4)$, radius = $2\sqrt{2}$

E) None of the above

Solve.

4) Find the length of the shorter leg of a right triangle if the longer leg is
   24 meters and the hypotenuse is 6 more than twice the shorter leg.

   A) 10 m

   B) 18 m

   C) 17 m

   D) 9 m

   E) None of the above

5) $\sqrt{16x - 32} = x + 2$

   A) -6

   B) 6

   C) -5

   D) 4

   E) None of the above

6) A cabin cruiser travels 20 miles in the same time that a power boat travels
   40 miles. The cruiser travels 5 mph slower than the power boat. Find the speed of each
   boat.

   A) Power boat travels 15 mph and cruiser travels 10 mph.

   B) Power boat travels 20 mph and cruiser travels 15 mph.

   C) Power boat travels 5 mph and cruiser travels 10 mph.

   D) Power boat travels 10 mph and cruiser travels 5 mph.

   E) None of the above

Solve the equation.

7) $2^{(3x - 7)} = 4$

   A) $\dfrac{1}{2}$

   B) -3

   C) 1

   D) 3

   E) None of the above

8) $-\frac{1}{9}(x + 27) + \frac{1}{9}(x + 9) = x + 9$

    A) 3

    B) 5

    C) - 3

    D) - 11

    E) None of the above

9) $\frac{5}{x + 5} - \frac{7}{x - 5} = \frac{4}{x^2 - 25}$

    A) 64

    B) -32

    C) 32

    D) $\sqrt{56}$

    E) None of the above

Multiply, and then simplify if possible.

    10) $2\sqrt{7}(\sqrt{11} + \sqrt{7})$

        A) $2\sqrt{77} + 14$

        B) $14\sqrt{11} + 14$

        C) $2\sqrt{11} + 7$

        D) $2\sqrt{77} + 7$

        E) None of the above

Find an equation of the line. Write the equation in standard form.

    11) Through (5, 4); parallel to 8x + 3y = 3

        A) 3x - 8y = 52

        B) 8x - 3y = 52

        C) 3x + 8y = 52

        D) 8x + 3y = 52
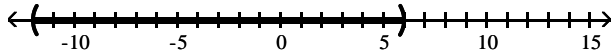
        E) None of the above

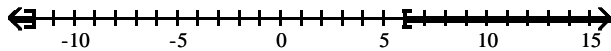Solve the inequality. Graph the solution set.

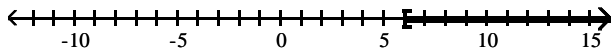12) $|x + 3| - 7 \geq 2$

A) $[-12, 6]$
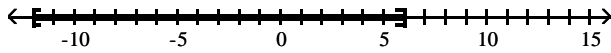
B) $(-12, 6)$

C) $(-\infty, -12] \cup [6, \infty)$

D) $[6, \infty)$

E) None of the above

Factor completely using the factor by grouping method.

13) $3x^3 + 9x^2 - 12x - 36$

A) $3(x - 4)(x - 3)$

B) $3(x + 4)(x - 3)$

C) $3(x + 2)(x - 2)(x - 3)$

D) $3(x + 2)(x - 2)(x + 3)$

E) None of the above

Use the properties of exponents to simplify the expression. Write with positive exponents.

14) $\dfrac{(-3x^{5/6})^4}{x^{-3/2}}$

    A) $-3x^{11/6}$

    B) $81x^{29/6}$

    C) $81x^{11/6}$

    D) $-3x^{29/6}$

    E) None of the above

Use the quadratic formula to solve the equation.

15) $2x^2 + 10x = -3$

    A) $\dfrac{-5 - \sqrt{19}}{4}, \dfrac{-5 + \sqrt{19}}{4}$

    B) $\dfrac{-10 - \sqrt{19}}{2}, \dfrac{-10 + \sqrt{19}}{2}$

    C) $\dfrac{-5 - \sqrt{31}}{2}, \dfrac{-5 + \sqrt{31}}{2}$

    D) $\dfrac{-5 - \sqrt{19}}{2}, \dfrac{-5 + \sqrt{19}}{2}$

    E) None of the above

Find the domain of the rational function.

16) $f(x) = \dfrac{3x}{4 - x}$

    A) {x|x is a real number and x ≠ 4}

    B) {x|x is a real number and x ≠ 0, x ≠ -4}

    C) {x|x is a real number and x ≠ 0}

    D) {x|x is a real number and x ≠ -4}

    E) None of the above

Determine the domain of the function.

17) $f(x) = \sqrt{x + 3}$

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

     B) $[-3, \infty)$

     C) $[3, \infty)$

     D) $(-\infty, 3)$

     E) None of the above

Factor completely

18) $64x^3 + y^3$

     A) $(4x - y)(16x^2 + 4xy + y^2)$

     B) $(4x + y)(16x^2 - 4xy + y^2)$

     C) $(4x + y)(16x^2 + 4xy + y^2)$

     D) $(4x + y)(16x^2 + y^2)$

     E) None of the above

Multiply or divide as indicated. Simplify completely.

19) $\dfrac{x^2 + 5x - 6}{x^2 + 9x + 18} \div \dfrac{x^2 - 1}{x^2 + 7x + 12}$

     A) $\dfrac{x + 4}{x + 1}$

     B) $\dfrac{x - 1}{x + 4}$

     C) $\dfrac{x + 4}{x - 1}$

     D) $\dfrac{x + 1}{x + 4}$

     E) None of the above

Divide.

20) $\dfrac{15x^7 + 12x^6 + 6x^5}{3x^6}$

    A) $5x + 12x^6 + \dfrac{2}{x}$

    B) $7x + 4$

    C) $5x + 4$

    D) $5x + 4 + \dfrac{2}{x}$
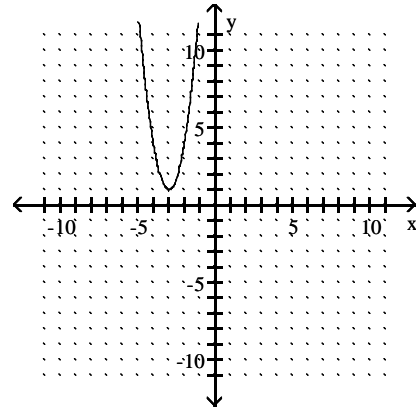
    E) None of the above

Sketch the graph of the quadratic function. Give the vertex and axis of symmetry.
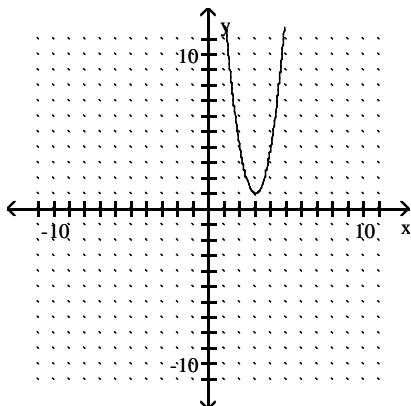
21) $f(x) = 3(x+3)^2 + 1$
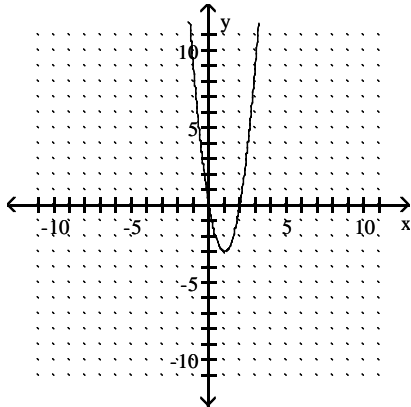
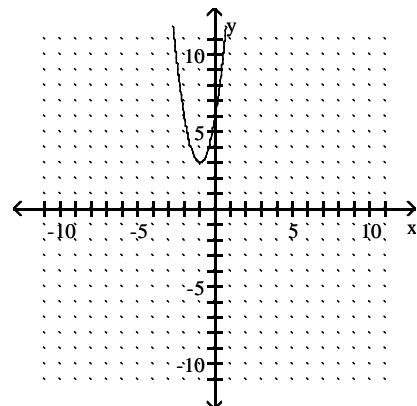   A) vertex (1, -3); axis x = 1   B) vertex (-3, 1); axis x = -3

    C) vertex (3, 1); axis x = 3   D) vertex (-1, 3); axis x = -1

Perform the indicated operation. Write the result in the form a + bi.

22) $\dfrac{2 + 5i}{7 + 2i}$

    A) $\dfrac{8}{15} + \dfrac{31}{45}i$

    B) $\dfrac{4}{45} + \dfrac{31}{45}i$

    C) $\dfrac{24}{53} + \dfrac{31}{53}i$

    D) $\dfrac{4}{53} - \dfrac{39}{53}i$

    E) None of the above

Solve the equation

23) $\log_3 x = 5$

    A) 1.46

    B) 125

    C) 243

    D) 15

    E) None of the above

Solve

24) University Theater sold 422 tickets for a play. Tickets cost $22 per adult and $13 per senior citizen. If total receipts were $6530, how many senior citizen tickets were sold?

    A) 306 senior citizen tickets

    B) 216 senior citizen tickets

    C) 116 senior citizen tickets

    D) 206 senior citizen tickets

    E) None of the above

Solve the system of equations for y.

25)
$$\begin{cases} 2x + y + z = 6 \\ 2x - 2y - z = 15 \\ x + y + 3z = 8 \end{cases}$$

   A) $y = 4$

   B) $y = -5$

   C) $y = 3$

   D) $y = 5$

   E) No solution

Add or subtract. Assume all variables represent positive real numbers.

26) $\sqrt{2a} + 6\sqrt{8a} + 5\sqrt{32a}$

   A) $11\sqrt{42a}$

   B) $33\sqrt{42a}$

   C) $11\sqrt{2a}$

   D) $33\sqrt{2a}$

   E) None of the above
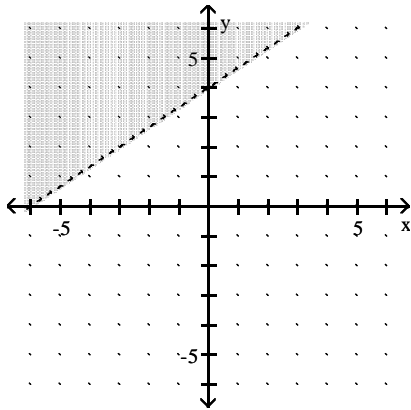
Rationalize the denominator and simplify.

27) $\dfrac{4}{5 - \sqrt{10}}$

   A) $\dfrac{4}{5} - \dfrac{4}{\sqrt{10}}$

   B) $\dfrac{20 - 4\sqrt{10}}{15}$

   C) $\dfrac{20 + 4\sqrt{10}}{5}$

   D) $\dfrac{20 + 4\sqrt{10}}{15}$

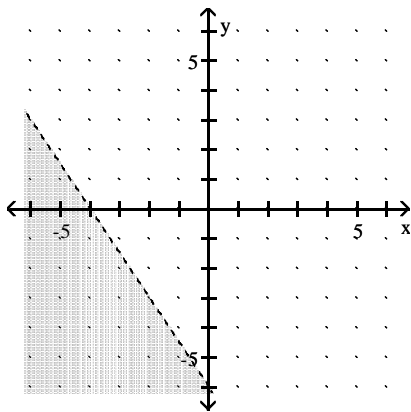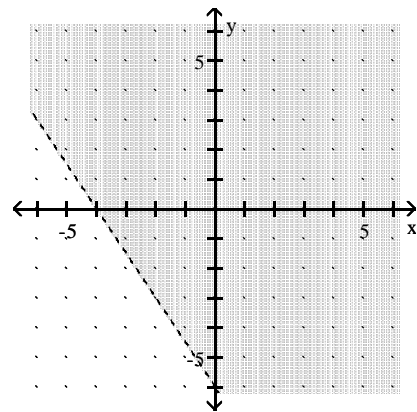   E) None of the above

Graph the inequality.

28) -6x - 4y < 24

A)

B)
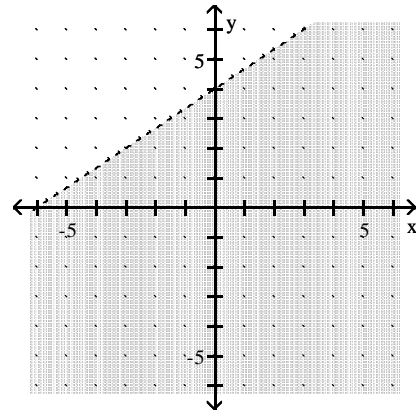
C)

D)

Simplify.

29)

$$\dfrac{\dfrac{1}{x-9}}{\dfrac{5}{x-9}+\dfrac{4}{x}}$$

    A) $\dfrac{x}{9x+36}$

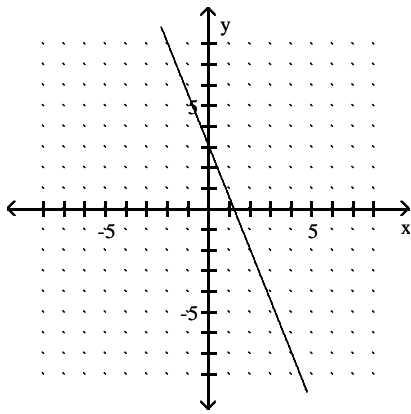   B) $\dfrac{x}{x-36}$

    C) $\dfrac{x}{x+36}$
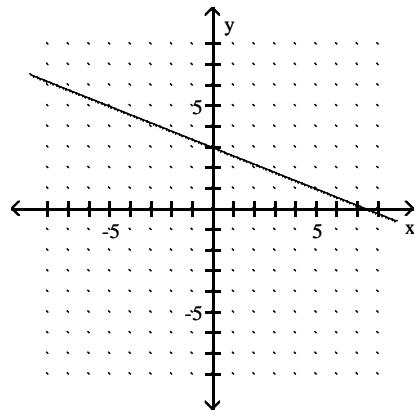
    D) $\dfrac{x}{9x-36}$

    E) None of the above
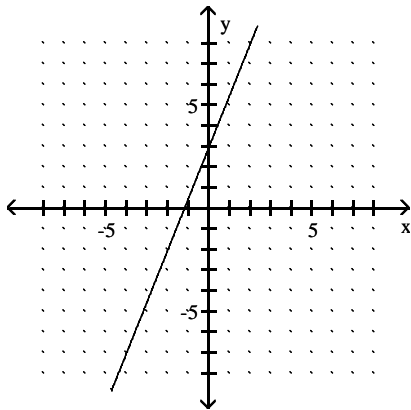
Graph the function.

30) $f(x) = \dfrac{2}{5}x + 3$

A)

B)

C)

D)
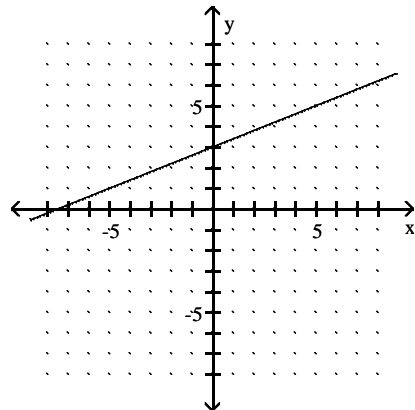
1) C
2) D
3) B
4) A
5) B
6) D
7) D
8) D
9) B
10) A
11) D
12) C
13) D
14) B
15) D
16) A
17) B
18) B
19) A
20) D
21) B
22) C
23) C
24) A
25) B
26) D
27) D
28) D
29) D
30) D