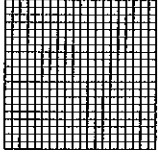




- 6.) Graph the equation  $y = x^2 - 2$ .



- 7.) Find the equation of the line passing through (4,5) and perpendicular to the line  $2x + 3y = 15$ .

- 8.) Solve  $3(x+4) - 5(x-1) = 12 - 3(x-2)$

9.) Solve the system: 
$$\begin{cases} x+2y+3z=4 \\ 2x+y-z=-2 \\ 3x+y-2z=-4 \end{cases}$$

- 10.) The Spice of Life sells ground sumac for \$1.35 an ounce and ground thyme for \$1.85 per ounce. Aman wants to make a 20 ounce Zahtar seasoning blend using the two spices that sells for \$1.65 per ounce. How much of each spice must be used?

Bonus: Does the equation  $y^2 - 2 = x$  represent a function? Why or why not?

Math 1010 Test 2

Show your work where appropriate. Unsupported answers may not receive full credit.

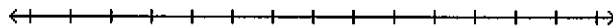
Name \_\_\_\_\_

1) Solve the inequality:

$$7 - 2(x + 3) > -5 + 8x$$

2) Solve the compound inequality and graph the solution set. Write your answer using interval notation.

$$x + 1 \leq -8 \text{ or } -x - 2 < 3$$



Interval Notation: \_\_\_\_\_

3) Find the domain of the function.  $f(x) = \sqrt{2x - 7}$ . Write your answer using interval notation.

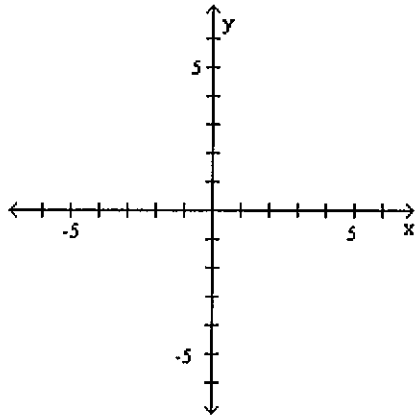


7) Solve the absolute value equation.

$$|4 - x| = |2x + 3|$$

8) Graph the system of inequalities.

$$\begin{cases} 3x - 5y \geq 15 \\ x < 3 \end{cases}$$

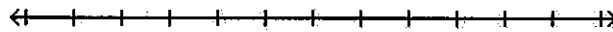


9) Factor completely.

$$3x^4 - 24x$$

10) Solve the inequality. Graph the solution set. Write your answer using interval notation.

$$|x-1| < 5$$



Interval Notation: \_\_\_\_\_

11) Factor **completely**.

$$x^3 + 2x^2 - 9x - 18$$

12) **Solve** the equation.

$$3x^2 - 13x - 10 = 0$$

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Show your work carefully and neatly on every problem, read and follow all instructions. Partial credit may be awarded, so be organized and clear in your solutions. All problems will be weighted equally. You may NOT use a calculator on this exam, nor any notes or books. You have 2 hours to complete this exam.

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1) Divide and simplify  $\frac{25x^2 - 1}{x^2 - 36} \div \frac{5x - 1}{x + 6}$

2) Simplify

$$\frac{\frac{3}{k+4} - \frac{5}{k-7}}{\frac{3}{k-7} + \frac{1}{k+3}}$$



3) Multiply  $\sqrt{-36} \cdot \sqrt{-64}$

4) Martha can rake the leaves in her yard in 3 hours. Her younger brother can do the job in 5 hours. How long will it take them to do the job if they work together?

5) Find the midpoint of the line segment with the endpoints  $(-1, -3)$  and  $(4, 9)$ .

6) Solve  $\sqrt{2x+3} - \sqrt{x+1} = 1$

7) Divide  $(6x^3 - 11x^2 + 2x + 11) \div (3x + 2)$

8) Perform the indicated operation and simplify. Write the answer in the form  $a + bi$ .

$$\frac{i}{4 + i}$$

9) Solve the formula  $I = \frac{E}{R + r}$  for  $r$ .

10) Simplify. Write the answer using positive exponents only. Leave the answer in exponential notation.

$$\left( \frac{2x^3y^{-3}}{x^{-2}y^4} \right)^{-3}$$

11) Rewrite using exponential notation. Assume that even roots are of nonnegative quantities.

$$\sqrt{x^9}$$

12) Multiply and simplify. Assume all variables represent nonnegative real numbers. Write your answer in radical notation.

$$\sqrt{14m^5} \cdot \sqrt{7m^{19}}$$

13) Rationalize the denominator. Assume all variables represent positive numbers.

$$\sqrt[3]{\frac{5}{9x^2}}$$

14) Add or subtract. Simplify by combining like radical terms, if possible. Assume all variables and radicands represent nonnegative numbers.

$$4\sqrt[3]{4} - 7\sqrt{6} + 3\sqrt[3]{4} + 5\sqrt{6}$$

15) Divide  $\frac{-8x^{10} + 10x^8 - 4x^6}{2x^3}$

16) Perform the indicated operation and simplify. Write the answer in the form  $a + bi$ .  
 $(12 + 9i) - (2 + 4i)$

17) Multiply and simplify. Assume all variables represent nonnegative real numbers. Write your answer in radical notation.

$$\sqrt{x^2y^3} \cdot \sqrt[3]{xy^4}$$

18) Solve  $\sqrt{4x+5} = 9$



19) A loaded moving truck is traveling 20 mph faster than a freight train. In the time it takes the train to travel 90 miles, the truck travels 150 miles. Find the speed of the truck.

20) Find the distance between the pair of points. Give your answer in exact form.  
(-5, -5) and (1, -2)

21) Solve the equation  $\frac{x-3}{x+2} + \frac{5}{x+2} = \frac{x+6}{2x}$

22) Rationalize the denominator. Assume all variables represent positive numbers.

$$\frac{2}{8 - \sqrt{5}}$$

23) Find the length of the missing side of the right triangle. The legs of the right triangle are represented by  $a$  and  $b$ , and the hypotenuse is represented by  $c$ .

$$a = 6, b = 8$$

24) Subtract  $\frac{6}{4-y} - \frac{5}{y-4}$

25) Divide and, if possible, simplify. Assume all variables represent positive real numbers.

$$\frac{\sqrt{35xy^3}}{\sqrt{7x}}$$

Each problem is equally weighted. For full credit you must show appropriate work and clearly indicate your answer.

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**PART ONE: NO CALCULATOR ALLOWED**

Complete the first part without a calculator and then turn it in to receive the remainder of the test.

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1) Simplify.

a)  $\sqrt[3]{-27}$

b)  $\sqrt{\frac{16}{81}}$

2) Simplify.

a)  $36^{1/2}$

b)  $8^{2/3}$

Each problem is equally weighted. For full credit you must show appropriate work and clearly indicate your answer.

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PART TWO: SCIENTIFIC CALCULATORS ARE ALLOWED

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3) Divide and write your answer in the form of  $a + bi$ .

$$\frac{8 + 5i}{4 - 3i}$$

4) Add or subtract. Simplify by combining like radical terms, if possible.

$$3\sqrt{5} - 6\sqrt{125} + 2\sqrt{20}$$

5) Simplify. Write the answer using positive exponents only.

$$\frac{(3x^{-5}y^4)^3}{9xy^{-2}}$$

6) Solve.

$$x = \sqrt{3 - 2x} - 6$$

7) Given the two complex numbers,  $z_1$  and  $z_2$  below, find their sum, difference and product.

$$z_1 = (2 - 5i) \quad z_2 = (4 - 3i)$$

$$z_1 + z_2 =$$

$$z_1 - z_2 =$$

$$z_1 \cdot z_2 =$$

8) Rationalize the denominator.

$$\frac{2}{8 - \sqrt{5}}$$

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

$$\frac{x^{3/4} \cdot x^{-2/3}}{x^{-1/4}}$$

10) State the domain of each function.

a)  $f(x) = \sqrt[7]{x + 8}$

b)  $g(x) = \sqrt[4]{x - 3}$



- 11) Find the midpoint between the pair of points and also find exact distance between the pair of points and approximate distance rounded to the nearest tenth.

(2, -1) and (-3, 5)

Midpoint: \_\_\_\_\_

Exact distance: \_\_\_\_\_

Approximate distance: \_\_\_\_\_

- 12) Extra credit, 5 percentage points. Solve.

$$\frac{y}{y+4} + \frac{5}{y+3} = \frac{5}{y^2 + 7y + 12}$$

**Solve.**1) Let  $f(x) = (x + 7)^2$ . Find  $x$  so that  $f(x) = 72$ .

A)  $65, -79$

B)  $7 + 6\sqrt{2}, 7 - 6\sqrt{2}$

C)  $5, -19$

D)  $-7 + 6\sqrt{2}, -7 - 6\sqrt{2}$

2)  $8x(x - 5) - 25 = 5x(x - 6)$ 

A)  $-5, 5$

B)  $-\frac{5}{3}, 5$

C)  $\frac{5}{3}, -5$

D)  $-\frac{5}{3}, -5$

**Without graphing, find the vertex.**

3)  $f(x) = 5\left(x + \frac{1}{9}\right)^2 + 18$

A)  $\left(18, \frac{1}{9}\right)$

B)  $(5, 18)$

C)  $\left(\frac{1}{9}, 18\right)$

D)  $\left(-\frac{1}{9}, 18\right)$

**Solve the formula for the indicated letter. Assume that all variables represent nonnegative numbers.**

4)  $c^2 + d^2 + f^2 = g^2$ , for  $c$

A)  $c = -g + d + f$

B)  $c = g^2 - d^2 - f^2$

C)  $c = \sqrt{g^2 - d^2 - f^2}$

D)  $c = g - d - f$

Solve the problem.

- 5) Two pipes can fill a large tank in 10 hours. One of the pipes, used alone, takes 15 hours longer than the other to fill the tank. How long would each pipe take to fill the tank alone?
- A) 10 hr for one  
20 hr for the other
- B) 12.5 hr for one  
25 hr for the other
- C) 25 hr for one  
50 hr for the other
- D) 15 hr for one  
30 hr for the other

Write a quadratic equation having the given numbers as solutions.

6)  $-\frac{5}{2}, -\frac{4}{3}$

A)  $6x^2 + 23x - 20 = 0$

B)  $6x^2 + 23x + \frac{10}{3} = 0$

C)  $6x^2 + 23x + 20 = 0$

D)  $6x^2 + \frac{10}{3}x + 23 = 0$

Solve.

7)  $2m^2 + 6m + 3 = 0$

A)  $\frac{-3 \pm \sqrt{3}}{4}$

B)  $\frac{-3 \pm \sqrt{3}}{2}$

C)  $\frac{-3 \pm \sqrt{15}}{2}$

D)  $\frac{-6 \pm \sqrt{3}}{2}$

Find the x- and y-intercepts. If no x-intercepts exist, state so.

8)  $f(x) = 2x^2 + 4x - 70$

A) (7, 0), (-5, 0), (0, -70)

C) (7, 0), (5, 0), (0, 70)

B) (-7, 0), (5, 0), (0, -70)

D) (-7, 0), (-5, 0), (0, 70)

## Exam 5C

Complete the square to write the function in the form  $f(x) = a(x - h)^2 + k$ .

9)  $f(x) = x^2 + 5x + 6$

A)  $f(x) = \left(x - \left(-\frac{5}{2}\right)\right)^2 - \frac{1}{4}$

B)  $f(x) = \left(x - \frac{5}{2}\right)^2 + \frac{1}{4}$

C)  $f(x) = \left(x - \frac{5}{2}\right)^2 - \frac{1}{4}$

D)  $f(x) = \left(x - \left(-\frac{5}{2}\right)\right)^2 + \frac{9}{4}$

Solve.

10) A projectile is thrown upward so that its distance, in feet, above the ground after  $t$  seconds is

$$h = -14t^2 + 588t.$$
 What is its maximum height?

A) 8036 ft

B) 6174 ft

C) 310,758 ft

D) 21,609 ft

Find the line of symmetry.

11)  $f(x) = 2x^2 - 16x + 30$

A)  $x = 2$

B)  $x = -4$

C)  $x = -2$

D)  $x = 4$

**Extra Credit:** Use the discriminant to determine whether the following equations have solutions that are: two different rational solutions; two different irrational solutions; exactly one rational solution; or two different imaginary solutions.

12)  $3y^2 = 5y - 6$