

NAME: \_\_\_\_\_ Score \_\_\_\_\_ /100  
Please print

**SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION. NO WORK – NO CREDIT**

**Circle T or F, whichever is correct.**

**2 pts. each for 1 – 25. 4 pts. each for all others.**

1. T F Every rational number is an integer.
2. T F If an equation has a solution, then it is a conditional equation.
3. T F The graph of a linear equation in one variable is a line.
4. T F 2 is a solution of  $x^3 + x^2 + x = 30$
5. T F If both sides of an equation are multiplied by  $3x - 4$ , the resulting equation is equivalent to the original equation.

**Circle the symbol for the smallest set of numbers which contains the number given at the left.**

The Symbols are standard: **C** is the complex numbers, **R** is the real numbers, **F** is the irrational numbers, **Q** is the rational numbers, **Z** is the integers, **W** is the whole numbers, and **N** is the natural numbers.

6. The smallest set which contains -3 is **C R F Q Z W N**
7. The smallest set which contains  $\frac{2}{5} - 7i$  is **C R F Q Z W N**
8. The smallest set which contains  $\sqrt{\frac{5}{2}}$  is **C R F Q Z W N**
9. The smallest set which contains 17 is **C R F Q Z W N**
10. The smallest set which contains  $7i$  is **C R F Q Z W N**
11. The smallest set which contains  $\frac{6}{5}$  is **C R F Q Z W N**

**Fill in each of the blanks to make the statements true.**

12. The midpoint of the line segment joining the two points  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by the formula: \_\_\_\_\_
13. If the number 3 makes a particular equation true and 5 makes that same equation false, then that equation is a \_\_\_\_\_ equation.
14. Two equations are \_\_\_\_\_ if they have the same solution sets.

15. The graph of an equation consists of all the points, and only those points, whose coordinates are \_\_\_\_\_ of the equation.
16. If any \_\_\_\_\_ is added to both sides of an equation the resulting equation is equivalent to the original equation.
17. A linear equation in one variable is an equation that can be written in the form \_\_\_\_\_ where a and b are real numbers with a not zero.
18. The formula for the area of a trapezoid with bases b and B and height h is \_\_\_\_\_.
19. The norm of a complex number  $a + bi$  is \_\_\_\_\_.
20. The multiplicative inverse of a complex number  $a + bi$  is its \_\_\_\_\_ divided by its \_\_\_\_\_.

Circle **all** the words which could be used to correctly complete the sentence.

21.  $2x - 7 = 0$  is a (linear quadratic identity conditional contradiction) equation.
22.  $2x - 5 = 2x + 3$  is a (linear quadratic identity conditional contradiction) equation.
23.  $(x+2)(x + 5) = x^2 + 7x + 10$  is a (linear quadratic identity conditional contradiction) equation.
24.  $3x^2 + 4x = 3x + 2$  is a (linear quadratic identity conditional contradiction) equation.
25. Complete the statement of the Distributive Property.  
If a, b, and c are real numbers, then \_\_\_\_\_
26. Compute the sum  $(2 - 3i) + (6 + 4i)$ . **Show the steps.**

27. Compute the product  $(2 - 5i)(4 - 2i)$ . **Show the steps.**

28. Change  $(2 + 4i) \div (3 - 2i)$  to the equivalent division problem.

29. Solve  $5x - 7 = 3x + 1$ . **Show the steps.**

30. Use the Quadratic formula to solve  $3x^2 - 3x - 4 = 0$  **Show the steps.**

31. Calculate the distance between the points  $(3, 5)$  and  $(7, -2)$ .

32. Sketch the graph of  $\{x \mid 2 \leq x \leq 4\}$

33. Consider the following process for solving  $3x^2 - 7x = 6$ :

Eq.1  $3x^2 - 7x = 6$

Eq.2  $3x^2 - 7x - 6 = 0$

Eq.3  $(3x + 2)(x - 3) = 0$

Eq.4  $3x + 2 = 0$  OR  $x - 3 = 0$

Eq.5  $3x = -2$  OR  $x - 3 = 0$

Eq.6  $x = -\frac{2}{3}$  OR  $x = 3$

Eq.7 The solution set for the original equation is  $\{3, -\frac{2}{3}\}$ .

**Now answer the following four questions about the above process.**

33a. State the property which assures us that Eq.1 is equivalent to Eq.2 \_\_\_\_\_

\_\_\_\_\_

33b. State the property which assures us that Eq.3 is equivalent to the two equations joined with OR in Eq.4

\_\_\_\_\_

\_\_\_\_\_

33c. State the property which assures us the first equation in Eq.5 is equivalent to the first equation in Eq.6

\_\_\_\_\_

\_\_\_\_\_

33d. The equations in Eq.6 are called \_\_\_\_\_ equations.

34. Solve the equation  $\sqrt{2x - 1} = x - 2$

**I will help you by providing some of the steps. You are to supply the others.**

$\sqrt{2x - 1} = x - 2$  (I will square both sides)

$2x - 1 = x^2 - 4x + 4$

This second equation is not equivalent to the first equation. However, the solution set for the second

equation \_\_\_\_\_

\_\_\_\_\_

Now I will add  $-2x + 1$  to both sides of the second equation to obtain

$x^2 - 6x + 5 = 0$  (You can take it from here. Finish solving the equation. Find the solution set.)

35. Find all values of  $x$  satisfying the following conditions.

$$y_1 = 2x^2 + 5x - 4 \quad y_2 = -x^2 + 15x - 10 \quad \text{and} \quad y_1 - y_2 = 0$$

36. Consider the formula  $S = \frac{C}{1-r}$ . Solve for  $r$ .

38. A field is twice as long as it is wide. The perimeter of the field is 300 feet. What are its dimensions?