NAME: _____Score_____/100

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Circle T or F, whichever is correct.   (2 pts each)

1. T   F   The norm of a complex number is a real number.

2. T   F   The conjugate of a complex number is a real number.

3. T   F $\{x \,|\, x \in R \text{ and } 7 \le x < 12\} = [7,12)$

4. T   F $\sqrt{3}$ is a rational number.

5. T   F   If x – 3 is added to both sides of an equation, the resulting equation is equivalent to the original.

6. T   F   The reciprocal of $\dfrac{3}{19}$ is $-\dfrac{19}{3}$.

7. T   F $|x| = -5$ is a contradiction.

8. T   F   The set $\{x \,|\, x \text{ is an integer less than } 3\}$ contains a negative number.

9. T   F   The solution set for $3x + 2 = 7$ is an interval.

10. T   F   If both sides of an equation are multiplied by 3x – 5, the resulting equation is equivalent to the original equation.

11. **(2 pts)** Which of the following are equal to the interval [4, 7]. Mark your answers with an X.

☐ $\{x \,|\, 4 < x < 7\}$ ☐ $\{x \,|\, 4 \le x < 7\}$ ☐ $\{4, 5, 6\}$

☐ $\{x \,|\, 4 < x \le 7\}$ ☐ $\{x \,|\, 4 \le x \le 7\}$ ☐ $\{5, 6, 7\}$

☐ $[7, 4]$ ☐ $(3, 8)$ ☐ $\{x \,|\, x \in N \text{ and } 4 \le x \le 7\}$

12. **(2 pts)** Check each of the following which are equal to the fraction $\dfrac{x}{y}$.

☐ $\dfrac{-x}{-y}$ ☐ $-\dfrac{-x}{-y}$ ☐ $-\dfrac{x}{-y}$

☐ $-\dfrac{x}{y}$ ☐ $-\dfrac{-x}{y}$ ☐ $\dfrac{-x}{y}$

☐ $\dfrac{x}{-y}$ ☐ $\dfrac{y}{x}$

Fill in each of the blanks to make the statements true. (2 pts each)

13.   A binary operation is a _____ involving two operands.

14. The multiplicative inverse of a complex number is its _____ divided by its _____.

15. 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.

16. A binary _____ is a comparison of two operands.

17. If any expression is added to both sides of an equation the resulting equation is _____ to the original equation.

18. Two equations are _____ if they have the same solution sets.

19. An equation is a mathematical statement which contains an _____symbol.

20. When both sides of an equation are squared the solution set of the resulting equation _____ the solution set of the original equation.

21. A number that makes an equation _____ when substituted for the variable is called a solution of the equation.

22. A quadratic equation in one variable is an equation which may be written in the form _____ where a, b, and c are real numbers and a is not zero.

23. **(2 pts)** The solution set for an equation in one variable is { -2, 0, 3, 4}.
Sketch the graph of that equation.

24. **(2 pts)** Complete the Quadratic Formula
Quadratic Formula: The solutions of a quadratic equation $ax^2 + bx + c = 0$ are given by

25. **(2 pts)** Write the compact compound inequality which is equivalent to $|3x - 7| < 9$.

26. **(2 pts)** If p is a real number and p is not a solution of $4x^3 - 8x + 1 = 0$ and p is not a solution of $4x^3 - 8x + 1 < 0$, then p is a solution of $4x^3 - 8x + 1 > 0$. Why?

27. **(5 pts)** Solve the linear equation $3x + 5 = 2x + 6$

28. **(5 pts)** Use the quadratic formula to solve $x^2 + 5x + 3 = 0$ **No Decimals**

29. **(5 pts)** Solve the equation $\sqrt{2x - 1} = x - 2$

30. **(5 pts)** Solve the inequality $|2x – 1| > 3$

31. **(5 pts)** Solve $A = 2mw + 2mh + 2wh$ for h.

32. **(5 pts) (Show your work)** $(3 + 5i)(2 – 7i) =$

33. **(5 pts)** The length of a rectangular pool is 6 feet less than twice the width. If the perimeter is 126 feet, what are its dimensions?

34. **(2 pts)** Complete the following diagram to convert the division problem to an equivalent multiplication problem. **(I do not want you to compute the quotient.) No work required.**

$$(3 + 5i) \quad \div \quad (2 - 7i)$$
$$\downarrow \qquad\quad \downarrow \qquad\quad \downarrow$$

____   ____   ____

35. **(3 pts.)**   Write (3, 5] using set-builder notation.

36. **(3 pts.)**   Sketch the graph of (3, 5]

37. **(5 pts.)** Consider the complex number 3 – 4i.

    a. What is its real component? _____

    b. What is its complex component? _____

    c. What is its conjugate? _____

    d. What is its opposite? _____

    e. What is its norm? _____

    f. What is its multiplicative inverse?_____

    g. What is the product of 3 – 4i and its conjugate? _____

    h. $(3 - 4i)^2 =$ _____

    i. $(3 - 4i) + (2 + i) =$ _____

    j. $(3 - 4i) - (2 + i) =$ _____