

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

**SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION**

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

**2 pts. each for 1 – 25. 5 pts. each for all others.**

1. T F A solution of the equation  $x^3 - x^2 - x - 3 = 0$  is 2.
2. T F  $(-2, 5] = \{x \mid x \in \mathbb{R} \text{ and } -2 \leq x < 4\}$
3. T F The graph of a linear equation in one variable is a line.
4. T F The complex component of  $7 - 8i$  is  $-8i$ .
5. T F The sum of a complex number and its conjugate is a real number. (Hint: Do it)
6. T F  $3 + 9 = 17$  is a mathematical 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.

7. The smallest set which contains -3 is **C R F Q Z W N**
8. The smallest set which contains  $\frac{2}{5} - 7i$  is **C R F Q Z W N**
9. The smallest set which contains 8 is **C R F Q Z W N**
10. The smallest set which contains  $\frac{2}{3}$  is **C R F Q Z W N**
11. The smallest set which contains  $\sqrt{7}$  is **C R F Q Z W N**
12. The smallest set which contains  $-4i$  is **C R F Q Z W N**

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

13. The exact volume of a cylinder with radius 5 and height 3 is \_\_\_\_\_.
14. Write the formula for the area of a triangle. \_\_\_\_\_ . (Your answer must be a formula.)
15. A linear equation in one variable is an equation which may be written in the form \_\_\_\_\_.
16. A quadratic equation in one variable is an equation which may be written in the form \_\_\_\_\_.
17. A complex number is a number that can be written in the form \_\_\_\_\_ where a and b are real numbers and \_\_\_\_\_.

18. A number (or numbers) that makes an equation \_\_\_\_\_ when substituted for the variable (or variables) is called a \_\_\_\_\_ of the equation.
19. If any expression is added to both sides of an equation the resulting equation is \_\_\_\_\_ to the original equation.
20. The norm of  $2 - 5i$  is \_\_\_\_\_.
21. The discriminant of  $2x^2 - 3x + 4$  is \_\_\_\_\_.

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

22.  $2x - 7 = 0$  is a (linear quadratic identity conditional contradiction) equation.
23.  $2x - 5 = 2x + 3$  is a (linear quadratic identity conditional contradiction) equation.
24.  $(x+2)(x + 5) = x^2 + 7x + 10$  is a (linear quadratic identity conditional contradiction) equation.
25.  $3x^2 + 4x = 3x + 2$  is a (linear quadratic identity conditional contradiction) equation.
26. Write the quadratic formula.
27. Write the multiplicative inverse of the complex number  $5 - 3i$ .
28. Write the zero factor property.
29. Sketch the graph of  $2x - 6 = 0$
30. Compute the product  $(3 + 2i)(1 - 5i)$ . Your answer should be written in standard form. (Show your work. no work: no credit)
31. Change  $(3 + 2i) \div (1 - 5i)$  into an equivalent multiplication problem. (DO NOT perform the multiplication.)

32. Use the Quadratic formula to solve the equation  $x^2 + x - 1 = 0$ . (Show your work. no work: no credit)

33. Solve the equation  $3x - 2 = \sqrt{3}x + 8$ . (Show your work. no work: no credit)

34. A cone has radius 5 feet and volume  $25\pi$  cubic feet. What is the height? (Show your work. no work: no credit)

38. Two cyclists, 108 mi apart start riding toward each other at the same time. One cycles twice as fast as the other. If they meet 2 hours later, at what average speed is each cyclist traveling?  
Fill in the blanks to provide a correct and complete analysis of this question.

**Solution:**

Let  $x$  be the speed of the slower cyclist.

The speed of the other cyclist is \_\_\_\_\_.

The distance traveled by the slower cyclist (in 2 hr.) is \_\_\_\_\_.

The distance traveled by the second cyclist (in 2 hr.) is \_\_\_\_\_.

The sum of the distance traveled by the two cyclists is \_\_\_\_\_.

The sum of the distance traveled by the two cyclists is \_\_\_\_\_. **Must be different than the previous blank.**

We now have two expressions for the \_\_\_\_\_.

The model is therefore \_\_\_\_\_.

Ordinary means to solve this equation produces  $x = 18$ .

**Conclusion:** The slower cyclist is traveling at an average speed of \_\_\_\_\_ and the other at \_\_\_\_\_.