

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 $[2, 4) = \{x | x \in \mathbb{R} \text{ and } 2 \leq x < 4\}$
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.
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, and **P** is the prime numbers.

7. The smallest set which contains 3 is **C R F Q Z W N P**
8. The smallest set which contains $\frac{2}{5} - 7i$ is **C R F Q Z W N P**
9. The smallest set which contains $-\frac{7}{8}$ is **C R F Q Z W N P**
10. The smallest set which contains 6 is **C R F Q Z W N P**
11. The smallest set which contains $\sqrt{7}$ is **C R F Q Z W N P**
12. The smallest set which contains -43 is **C R F Q Z W N P**

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

13. The exact area of a circle with radius 5 is _____.
14. Write the formula for the volume of a cylinder. _____ . (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. If both sides of an equation are squared the solution set of the resulting equation _____ the solution set of the original equation.
21. Use set builder notation to describe the set of rational numbers less than 8 and greater than 5.

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. $(x + 2)(x - 3) = x^2 - x - 6$ is a (linear quadratic identity conditional contradiction) equation.
24. $x^2 - x - 6 = 0$ is a (linear quadratic identity conditional contradiction) equation.
25. $3x + 4 = 3x + 2$ is a (linear quadratic identity conditional contradiction) equation.
26. Write the quadratic formula.
27. Write the multiplicative inverse of the complex number $5 - 2i$.
28. Write the zero factor property.
29. Sketch the graph of $3x - 6 = 0$
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 $2x^2 - 13x + 15 = 0$. (Do not use the quadratic formula or completing the square.) (Show your work. no work: no credit)

34. A cone has radius 3 feet and volume 36π cubic feet. What is the height? (Show your work. no work: no credit)

38. How much water must be added to 20 ounces of a 15% acid solution to reduce it to a 10% acid solution?
Fill in the blanks to provide a correct and complete analysis of this question.

Solution: Let x be the amount of _____ to be added.

The amount of the final solution is _____.

The amount of acid in the original solution is _____.

The amount of acid in the final solution is _____.

The amount of acid in the final solution is _____. **Must be different than the previous blank.**

We now have two expressions for the _____.

The model is therefore _____.

Use ordinary means to solve this equation

$$(0.1)(x + 20) = 3$$

$$x + 20 = 3/(0.1) = 30$$

$$x = 10$$

Conclusion: _____ ounces of water must be _____ to obtain a 10% _____ solution.