

NAME: _____ Score _____ /100
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SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

2 points each for questions 1 – 25. 5 points each for questions 26 – 35.

Circle T or F, whichever is correct.

1. T F The graph of a linear inequality in one variable is a dot on the Real Number Line.
2. T F If any expression is added to both sides of an equation the resulting equation is equivalent to the original equation.
3. T F If any real number is added to both sides of an equation the resulting equation is equivalent to the original equation.
4. T F If both sides of an equation are multiplied by the same expression, the resulting equation is equivalent to the original equation.
5. T F $(3, 5] = \{x|3 < x < 5\}$.
6. T F $x^3 + 4x^2 + x$ is an equation.
7. T F The solution set for an equation is the set of all solutions for that equation.
8. T F The equation $3x + 2 = -7x + \pi$ is a linear equation in one variable.
9. T F A formula must contain an = symbol.
10. T F $-x = 4$ is a simplest equation.

Fill in each of the blanks to make the statements true. Remember what a formula is!

11. The formula for the circumference of a circle with radius r is _____.
12. The formula for the volume of a cone with radius r and height h is _____.
13. The formula for the area of a triangle with base b and height h is _____.
14. **The Distributive Property:** If a , b , and c are real numbers, then _____.
15. The formula for the perimeter of a rectangle with length x and width y is _____.
16. **The Transitive Property:** If a , b , and c are real numbers such that $a = b$ and $b = c$, then _____.
17. Write the interval $[-2, 5]$ in set builder notation _____.
18. Write $\{x|2 \leq x < 7\}$ in interval notation _____.
19. Show that -2 is a solution of the equation $x^3 + 4x^2 + x = 6$.

20. $\{1, 3, A, c\} \cap \{4, a, c, 2, 1\} =$ _____. **Your answer must be written as a set!**
21. The solution set of a compound inequality formed with the word **and** is the _____ of the solution sets of the two inequalities.
22. A linear inequality in one variable x is an inequality which can be written in the form _____.
23. If $5x - 9$ is added to both sides of $5x^{-3} + 2x^3 = 8x - 3$ the resulting equation is _____ to $5x^{-3} + 2x^3 = 8x - 3$.
24. The solution set for $3x + 1 > 7$ is the ray $(2, \infty)$. The solution set for $2x + 5 < -3$ is $(-\infty, -4)$. What is the solution set for the compound inequality $3x + 1 > 7$ OR $2x - 5 < 3$? _____.
25. The equation $2x = 7x - 5x$ is an example of an _____.
26. A woman earns 15% more than her husband. Together they earn \$69,875 per year. What is the husband's annual salary? You are to answer this question by filling in the blanks in the following solution.

Solution:

Let x be the _____.

Then the wife's salary is _____ = _____.

Their combined annual income is _____.

Their combined annual income is _____.

We now have two expressions for the _____ quantity.

Therefore these two expressions are _____.

This yields the equation _____.

Which can be solved by ordinary means to obtain $x = 32,500$.

This leads to the following conclusion:

The _____ is _____.

27. Label, by circling the correct word, each of the following as an expression, equation, or inequality.

- a) $\frac{1}{3}x - 5$ (expression equation inequality)
- b) $2(x - 3) = 7$ (expression equation inequality)
- c) $x > 4x^3 - 1$ (expression equation inequality)
- c) $\frac{5}{9}x + \frac{1}{3} = \frac{2}{9} - \sqrt{17}x$ (expression equation inequality)
- d) $\frac{5}{9}x - \frac{2}{3} + \frac{2}{9} - \sqrt{17}x^2$ (expression equation inequality)

28. Label, by circling the correct word, each of the following as an identity, a conditional equation, or a contradiction.

- a) $2x + 3 = 2x + 3$ (identity conditional contradiction)
- b) $2x + 1 = 2x + 3$ (identity conditional contradiction)
- c) $5x - 2 = -7 + 5x$ (identity conditional contradiction)
- d) $5x - 3 = 6$ (identity conditional contradiction)
- e) $x^2 = x$ (identity conditional contradiction)

29. Which of the following are linear equations in one variable. Indicate your answer by circling YES or NO.

a) $2x - 4 = 7$ (YES NO)

b) $\frac{3}{x} = 5$ (YES NO)

c) $2x + 3y = 12$ (YES NO)

d) $\sqrt{3}x + \pi = \frac{15}{4}x - 2$ (YES NO)

e) $x = 2$ (YES NO)

Show your work on exercises 30 – 35 inclusive. All your work and answers must be exact!

No work –No Credit Be neat!

30. Solve $T = 3vk - 4wk + 5vw$ for k

31. Solve the equation $5x - 7 = 11x + 2$. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

32. Solve the equation $3x + \sqrt{3} = x - 1$. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

33. Solve the inequality $5x - 7 < 11x + 2$. Write the solution set in set builder notation. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

34. Solve and graph the inequality $3x - 4 > 5x + 2$. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

35. Solve the compound inequality $-2 < \frac{-2x - 1}{3} < 2$. Write the solution set in interval notation. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.