

NAME: _____ Score _____ /100
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Questions 1 – 20 are 2 pts each.

1. T F The formula for the area of a triangle with base b and height h is $A = \frac{1}{2}bh$.
2. T F Every compound inequality can be written in compact form.
3. T F $3x + 7 > 2x - 9$ is an equation.
4. T F 5 is an element of $\{2, 9, 4, 3, 5\}$.
5. T F $2 < x < 9$ is a compact compound inequality.
6. T F The solution set for a conditional linear equation in one variable is a set containing a single number.
7. T F If both sides of an inequality are multiplied by the same negative real number the resulting inequality is equivalent to the original inequality.
8. T F The formula for the circumference of a circle with radius r is: $C = \pi r^2$.
9. T F The solution set for $|ax + b| < k$ is an interval on the number line.
10. T F The Law of Trichotomy informs us that each real number is a solution for one of $|ax + b| = k$, $|ax + b| < k$, or $|ax + b| > k$.
11. A _____ equation is an equation which is true when some real numbers are substituted for the variables and is false when some real numbers are substituted for the variables.
12. A number that makes an inequality _____ when substituted for the variable is called a solution of the inequality.
13. Two equations are _____ if they have the same solution sets.
14. If any expression is added to both sides of an equation the resulting equation is _____ to the original equation.
15. If both sides of an equation are multiplied by the same _____ number, the resulting equation is equivalent to the original equation.
16. The formula for the volume of a cone with radius r and height h is _____.
17. The distance d traveled at a rate r in time t is given by _____.
18. If an interval (p, q) is a solution to an inequality of the form $|ax + b| < k$, then the endpoints p and q are solutions of _____.

19. **Law of Trichotomy:** If a and b are real numbers, then one and only one of the following is true:

i) _____

ii) _____

iii) _____

20. The absolute value of a number is its distance from 0 on the number line. A more precise algebraic

definition is: $|x| = \begin{cases} \text{---} & \text{if } x \geq 0 \\ \text{---} & \text{if } x < 0 \end{cases}$

Questions 21 – 30 are 5 pts. each.

21. One garden is a square. A second garden is an equilateral triangle (sides are equal in length). The perimeter of the square garden is equal to the perimeter of the triangular garden. A side of the triangular garden is 15 feet longer than a side of the square. What are the dimensions of the gardens? **Hint: Draw pictures of each garden and label the sides. Then work with perimeter.**

22. On a recent day in St. Louis, the heat index was 104°F . Write that temperature in degrees Celsius. Use the formula $C = \frac{5}{9}(F - 32)$.

23. Solve $A = Prt + P$ for P .

24. Write $(3, 8]$ in set-builder notation.

25. Write $\left\{x \mid \frac{3}{4} \leq x < 1\right\}$ in interval notation.

26. Solve $3x + 7 > 9x - 5$.

27. Show that 1 is a solution of the equation $5x^5 - 2x^4 = 3$.

28. Solve the equation $3(x - 6) = 5x$.

29. Solve the equation $3x + \sqrt{5} = \sqrt{2}x - \pi$.

30. The sum of two consecutive natural numbers is 525. Find the numbers.

31. **(10 Pts.)** Because $|3x - 6| < 9$ is equivalent to the compact compound inequality $-9 < 3x - 6 < 9$ we use computational methods to solve it.

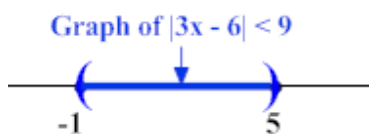
$$-9 < 3x - 6 < 9$$

$$-3 < 3x < 15$$

$$-1 < x < 5$$

The solution set for $|3x - 6| < 9$ is the interval $(-1, 5) = \{x | -1 < x < 5\}$.

The graph of $|3x - 6| < 9$ is



a) Based on the above work what is the solution set for $|3x - 6| = 9$? **Use the roster method to write the set.**

b) Based on the above work what is the solution set for $|3x - 6| > 9$? **Write the solution set in both set-builder notation and interval notation.**

c) Sketch the graph of $|3x - 6| > 9$.