

1. (1 pt.) If two expressions represent the same quantity, those two expressions are **equal**.
2. (1 pt.) A **linear** equation in **one** variable is an equation that can be written in the form $ax + b = 0$ where a and b are real numbers with $a \neq 0$.
3. (1 pt.) Two equations are **equivalent** if they have the same solution sets.
4. (1 pt.) T **F** A linear equation in one variable can have exactly two solutions.
5. (1 pt.) **T** F The solution set for a linear equation in one variable can be the null set.
6. (1 pt.) If both sides of an equation are multiplied by the same **non-zero real number**, the resulting equation is equivalent to the original equation.
7. (2 pt.) Observe that 1 is a solution for the equation $x^3 - x^2 + x - 1 = 0$. Is that enough information to decide that the solution set for the equation $x^3 - x^2 + x - 1 = 0$ is $\{1\}$?
Explain your answer
No. Because there may be other solutions and the solution set is the set of ALL solutions.
8. (2 pt.) A rectangle whose width is 5 ft. less than its length has a perimeter of 90 ft. What is the area of the rectangle?

Show your work. Completely and neatly. Write sentences.

Let x be the length of the rectangle.

Then $x - 5$ is the width of the rectangle. (2)

The perimeter is 90.

The perimeter is $x + x + (x - 5) + (x - 5) = 4x - 10$.

We now have two expressions for the same quantity. (1)

Therefore those two expressions must be equal. (1)

This yields the equation $4x - 10 = 90$.

Solve that equation to obtain $x = 25$ as the length. (3)

Then the width is 20.

From which it follows that $A = (\text{length})(\text{width}) = 500 \text{ sq.ft.}$

COMMENTS: OBSERVE THE SENTENCES. Exactly like I presented these problems in class.

Item (1): Not one paper included a statement of this extremely important application of the Transitive Property of Equality. Was it not included because you didn't believe me when I explained its importance? Was it not included because you find the logic too difficult or obtuse? Was it not included because you don't know or don't understand the Transitive Property of Equality? I will tell you one more time! That application of the Transitive Property of Equality is the key to solving EVERY word problem. Of course it must be preceded by an orderly presentation of information.

Item (2): If you let x be the length, then it follows from that and the statement of the problem that the width is $x - 5$. To write "Let $x - 5$ be the width" is incorrect, because there is no choice involved.

Item (3): Notice that this equation can easily be solved, the question is not about the process of solving equations, so it is not necessary to include every small step. However, it is perfectly okay to include those solution steps.