Section 2.3: SOLVING LINEAR EQUATIONS

When you are done with your homework you should be able to…

- Solve linear equations
- Solve linear equations containing fractions
- Identify equations with no solution or infinitely many solutions
- Solve applied problems using formulas

WARM-UP:

Solve:

1. $-12z = 144$
2. $-x = -7x + 24$

A STEP-BY-STEP PROCEDURE FOR SOLVING LINEAR EQUATIONS

1. _____ the _____ _____ on each side.
2. Collect all the _____ terms on one side and all the _____ terms on the other side.
3. _____ the _____ and _____.
4. _____ the proposed solution in the _____ equation.

Example 1: Solve the following equations. Check your solutions.

1. $-z - 34 + 10z = 2 + 10z - 54$
4. $3(x+2) = x + 30$

2. $20 = 44 - 8(2 - x)$

5. $2(x - 15) + 3x = (6 + 4x) - (9x - 2)$

3. $5x - 4(x + 9) = 2x + 3$

6. $100 = -(x - 1) + 4(x - 6)$

LINEAR EQUATIONS WITH FRACTIONS

Equations are _____ to solve when they do not contain _____. To remove fractions, we can _____ _____ sides of the equation by the _____ _____ _____ of any fractions in the equation. Remember…the _____ is the _____ number that all _____ will _____ into. This is often called "_____ an equation of _____".

Example 2: Solve the following equations. Clear the fractions first. Check your solutions.

1. $\frac{x}{2}+13=-22$

2. $\frac{z}{5}-\frac{1}{2}=\frac{z}{6}$

3. $\frac{3y}{4}-\frac{2}{3}=\frac{7}{12}$

4. $\frac{x-2}{3}-4=\frac{x+1}{4}$

RECOGNIZING INCONSISTENT EQUATIONS AND IDENTITIES

If you attempt to _____ an equation with _____ _____ or one that is _____ for _____ real number, you will _____ the _____.

- An _____ equation with _____ _____ results in a _____ statement, such as _____.
- An _____ that is _____ for _____ real number results in a _____ statement, such as _____.

Example 3: Solve the following equations. Use words or set notation to identify equations that have no solution, or equations that are true for all real numbers. Check your solutions.

1. $2(x-5)=2x+10$

2. $5x-5=3x-7+2(x+1)$

3. $\frac{x}{2}+\frac{2x}{3}+3=x+3$

4. $\frac{x}{4}+3=\frac{x}{4}$

APPLICATIONS

1. The formula $p = 15 + \frac{5d}{11}$ describes the pressure of sea water, *p,* in pounds per square foot, at a depth of *d* feet below the surface.

a. The record depth for breath-held diving, by Francisco Ferreras (Cuba) off Grand Bahama Island, on November 14, 1993, involved pressure of 201 pounds per square foot. To what depth did Francisco descend on this venture? (He was underwater for 2 minutes and 9 seconds!)

b. At what depth is the pressure 20 pounds per square foot?