Pre-Algebra
Skill Builder #LE - 3
Solving Two-Step Linear Equations

From the two skill builders ago: \[ a = b \Leftrightarrow a + c = b + c \]
From the last skill builder: \[ a = b \Leftrightarrow ac = bc \quad (c \neq 0) \]
In this skill builder: We will have to use both properties to solve the equation

Here are some illustrations of equations solved using these properties:

1) \[ 5x - 45 = 50 \quad \text{we wish to solve this equation} \]
   \[ 5x - 45 + 45 = 50 + 45 \quad \text{add 45 to both sides} \]
   \[ 5x = 95 \quad \text{simplify} \]
   \[ \frac{1}{5} \cdot 5x = \frac{1}{5} \cdot 95 \quad \text{mult. by the reciprocal of 5} \]
   \[ \frac{5}{5} \cdot x = \frac{95}{5} \quad \text{we rewrite this way to cancel} \]
   \[ 1 \cdot x = 95 \quad \text{now we cancel} \]
   \[ x = 95 \quad \text{identity property of real numbers} \]

2) \[ -6x - 40 = 26 \quad \text{we wish to solve this equation} \]
   \[ -6x - 40 + 40 = 26 + 40 \quad \text{add 40 to both sides} \]
   \[ -6x = 66 \quad \text{simplify} \]
   \[ -\frac{1}{6}(-6x) = -\frac{1}{6} \cdot 66 \quad \text{mult. by the reciprocal of -6} \]
   \[ -\frac{6}{6} \cdot x = \frac{66}{6} \quad \text{we rewrite this way to cancel} \]
   \[ 1 \cdot x = -11 \quad \text{we have cancelled} \]
   \[ x = -11 \quad \text{identity property of real numbers} \]

3) \[ \frac{z}{4} - 9 = 18 \quad \text{we wish to solve this equation} \]
   \[ \frac{z}{4} - 9 + 9 = 18 + 9 \quad \text{add 9 to both sides} \]
   \[ \frac{z}{4} = 27 \quad \text{simplify} \]
   \[ 4 \cdot \frac{z}{4} = 4 \cdot 27 \quad \text{mult. by the reciprocal of } \frac{1}{4} \]
   \[ z = 108 \quad \text{simplify and here we have our solution} \]
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Solve the following equations.

1) \(9x - 2 = 52\)  
2) \(-5x + 22 = -33\)

3) \(4z - 3 = 21\)  
4) \(\frac{y+1}{5} = 2\)

5) \(\frac{x}{3} - 6 = -2\)  
6) \(1 - 3x = 7\)

7) \(3x - 4 = 11\)  
8) \(1 - 1.2w = 3.4\)

(a little more difficult)
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Answer Key:
1) \( x = 6 \)  
2) \( x = 11 \)

3) \( z = 6 \)  
4) \( y = 9 \)

5) \( z = 12 \)  
6) \( x = -2 \)

7) \( x = 5 \)  
8) \( w = -2 \)

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