Solving Equations Using Structure

Look for ways to use the structure of the equation to reason with and solve each of the following equations. Explain your thinking.

1. \(4(x + 6) + 2 = 4(2x + 1) + 2\)

2. \(\frac{2x + 7}{5} = \frac{13}{5}\)

3. \(3x + x = x - 18\)

4. \(2x + 7x - 2 = 2x + 12\)

5. \((5x + 9) + 8 = 2(5x + 9)\)

6. \(\frac{1}{2}(3x + 4) = 3\)

7. \(10 - 4x = 8\)

8. \(\frac{4x + 3}{2} + 5x = 5x + \frac{7}{2}\)

9. \(6(x + 9) + 4 = 8(x + 9) - 6\)

10. \((3x + 7) + 2 = \frac{1}{2}(6x + 14) + 4x\)
Solving Equations Using Structure - ANSWER KEY

Look for ways to use the structure of the equation to reason with and solve each of the following equations. Explain your thinking.

1. \(4(x + 6) + 2 = 4(2x + 1) + 2\)
   \[x + 6 = 2x + 1\]
   \[5 = x\]

2. \(\frac{2x+7}{5} = \frac{13}{5}\)
   \[2x + 7 = 13\]
   \[2x = 6\]
   \[x = 3\]

3. \(3x + x = x - 18\)
   \[3x = -18\]
   \[x = -6\]

4. \(2x + 7x - 2 = 2x + 12\)
   \[7x - 2 = 12\]
   \[7x = 14\]
   \[x = 2\]

5. \((5x + 9) + 8 = 2(5x + 9)\)
   \[8 = 5x + 9\]
   \[-1 = 5x\]
   \[-1/5 = x\]

6. \(\frac{1}{2}(3x + 4) = 3\)
   \[3x + 4 = 6\]
   \[3x = 2\]
   \[x = 2/3\]

7. \(10 - 4x = 8\)
   \[-4x = 2\]
   \[x = -1/2\]

8. \(\frac{4x+3}{2} + 5x = 5x + \frac{7}{2}\)
   \[4x + 3 = 7\]
   \[x = 1\]

9. \(6(x + 9) + 4 = 8(x + 9) - 6\)
   \[4 = 2(x + 9) - 6\]
   \[2 = x + 9 - 3\]
   \[2 = x + 6\]
   \[-4 = x\]

10. \((3x + 7) + 2 = \frac{1}{2}(6x + 14) + 4x\)
    \[(3x + 7) + 2 = (3x + 7) + 4x\]
    \[2 = 4x\]
    \[\frac{1}{2} = x\]