

Grade 7 Math – Art of Problem Solving

4.3 Solving Two-Step Equations

Work in class. Show reasoning, examples, or diagrams that support your conclusions.

REASON ABOUT SOLUTIONS

1. Two valid routes. Solve $-4(x - 3) = 20$ in two different ways. Explain why both preserve the solution.

2. Recover the constant. The equation $\frac{2}{3}x + c = -5$ has solution $x = -9$. Find c and check the original equation.

3. A total and a fee. Two clubs pay the same total of \$38 for a room. Club A pays a \$6 fee plus \$4 per hour; Club B pays a \$11 fee plus \$3 per hour. Find each rental time. Explain why equal bills need not mean equal times.

Grade 7 Math – Art of Problem Solving**4.3 Solving Two-Step Equations (Continued)**

Work in class. Show reasoning, examples, or diagrams that support your conclusions.

DEEPEN THE REASONING

4. Equivalent or coincidental? Compare $2x + 7 = 15$ and $-3x + 20 = 8$. Are the equations equivalent? Are $2x + 7$ and $-3x + 20$ equal at that common solution? Explain.

5. Predict before solving. In $5x + c = 20$, c increases by 10 while the right side stays fixed. How does x change? Prove your claim.

6. Build the equation. Use the numbers 2, 5, and 11 exactly once in $ax + b = c$. Choose their positions to make the solution a negative integer. Find all arrangements that work and justify completeness.
