Year 7 two-step equations worksheet

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Name: _____ Date: _____

Question 1

Write the equation that results when you add 5 to both sides of x - 5 = 12.

Answer: _____

Question 2

Solve 2x + 5 = 17, then verify your solution by substitution.

Answer: _____

Question 3

Start with x = 3. Multiply both sides by 4, then add 7 to both sides. Write the new equation.

Answer: _____

Question 4

(a) A gym charges a $40 joining fee plus $12 per visit. Sam paid $148 in total. Write an equation and solve it to find how many times he visited.

(b) Solve 5x - 7 = 2x + 14.

Answer: _____

Question 5

Which of these equations are equivalent to 2x + 1 = 9?

A. 2x = 8 B. x = 4 C. 2x + 5 = 13 D. 4x + 1 = 18

Answer: _____

Question 6

Solve 6x - 11 = 25.

Answer: _____

Question 7

Are the equations 3x = 15 and x + 2 = 7 equivalent? Explain.

Answer: _____

Question 8

Solve $9x + 4 = 5x + 28$.

Answer: _____

Question 9

Start with the equation $m = 6$.

(a) Multiply both sides by 5.

(b) Then subtract 8 from both sides.

(c) Then divide both sides by 2.

(d) Check that $m = 6$ is a solution of your final equation.

Answer: _____

Question 10

Solve $3x + 5 = 26$.

Answer: _____

Year 7 two-step equations: answers and worked solutions

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Question 1

Key idea: Doing the same operation to both sides gives an equivalent equation.

1. Left: x - 5 + 5 = x 2. Right: 12 + 5 = 17 3. New equation: x = 17

Answer: x = 17

Question 2

Key idea: Undo the operations in reverse order, subtract first, then divide.

1. Subtract 5 from both sides:\ 2x + 5 - 5 = 17 - 5 implies 2x = 12 2. Divide both sides by 2:\ x = 12/2 = 6 3. **Verify** by substituting x = 6 back into the original equation:\ 2(6) + 5 = 12 + 5 = 17 checkmark

Answer: x = 6

Question 3

Key idea: Build an equation by applying the same operations to both sides.

1. Multiply by 4: 4x = 12 2. Add 7: 4x + 7 = 19

Answer: 4x + 7 = 19

Question 4

Key idea: Undo operations in reverse order, doing the same thing to both sides each time. Collect pronumerals on one side first if they appear on both sides.

1. (a) Let v be the number of visits: 40 + 12v = 148 2. (a) Subtract 40: 12v = 108 3. (a) Divide by 12: v = 9. Check: 40 + 108 = 148 ✓ 4. (b) Subtract 2x from both sides: 3x - 7 = 14 5. (b) Add 7: 3x = 21 6. (b) Divide by 3: x = 7. Check: 35 - 7 = 28 and 14 + 14 = 28 ✓

Answer: (a) 40 + 12v = 148, v = 9 visits (b) x = 7

Question 5

Key idea: Equivalent equations have the same solution. First solve 2x + 1 = 9.

1. 2x + 1 = 9 gives 2x = 8 and x = 4 2. A: 2x = 8 gives x = 4 ✓; B: x = 4 ✓ 3. C: 2x + 5 = 13 gives 2x = 8, x = 4 ✓ 4. D: with x = 4, 4 × 4 + 1 = 17 ≠ 18 ✗

Answer: A, B and C

Question 6

Key idea: Undo the subtraction, then undo the multiplication, doing the same to both sides.

1. Add 11 to both sides: 6x = 36. 2. Divide both sides by 6: x = 6.

Answer: x = 6

Question 7

Key idea: Two equations are equivalent if they have exactly the same solution.

1. 3x = 15 gives x = 5 2. x + 2 = 7 gives x = 5 3. Same solution, so they are equivalent

Answer: Yes, both have solution x = 5

Question 8

Key idea: Collect the x terms on one side and the numbers on the other.

1. Subtract 5x from both sides: 4x + 4 = 28. 2. Subtract 4: 4x = 24. 3. Divide by 4: x = 6.

Answer: x = 6

Question 9

Key idea: Each step applies the same operation to both sides, so every new equation has the same solution m = 6.

1. (a) 5 × m = 5 × 6: 5m = 30 2. (b) 5m - 8 = 30 - 8: 5m - 8 = 22 3. (c) (5m - 8)/(2) = 22/2: (5m - 8)/(2) = 11 4. (d) (5 × 6 - 8)/(2) = 22/2 = 11 ✓

Answer: (a) 5m = 30 (b) 5m - 8 = 22 (c) (5m - 8)/(2) = 11 (d) (30 - 8)/(2) = 11 ✓

Question 10

Answer: x = 7