Year 9 linear equations worksheet

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Name: _____ Date: _____

Question 1

Solve:

(a) 5x - 7 = 18

(b) x/4 + 3 = -2

(c) 12 - 3x = 27

Answer: _____

Question 2

Solve 3(2x - 4) = 2x + 8.

Answer: _____

Question 3

The sum of three consecutive whole numbers is 87. Write and solve an equation to find the three numbers.

Answer: _____

Question 4

Solve (2x + 5)/(3) = 7.

Answer: _____

Question 5

Solve the equation 3x - 7 = 2x + 5 for x.

Answer: _____

Question 6

A phone plan costs $25 per month plus 15 cents per text message. Mai's bill for one month is $37.30. Write and solve an equation to find how many texts she sent.

Answer: _____

Question 7

Solve:

(a) 3x/4 = 9

(b) 3 - x/5 = 1

Answer: _____

Question 8

Solve 4(x + 3) = 3x + 17 and check your answer.

Answer: _____

Question 9

Kate is three times as old as her brother. In 8 years' time she will be twice as old as he will be. Find their ages now.

Answer: _____

Question 10

Solve each equation, then check your answer by substituting it back into the equation.

(a) 7 - 2x = -9

(b) (5 - x)/(2) = 6

(c) 0.4x + 1.2 = 3.6

Answer: _____

Year 9 linear equations: answers and worked solutions

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Question 1

Key idea: Undo the operations in reverse order, doing the same thing to both sides.

1. (a) Add 7: 5x = 25; divide by 5: x = 5 2. (b) Subtract 3: x/4 = -5; multiply by 4: x = -20 3. (c) Subtract 12: -3x = 15; divide by -3: x = -5

Answer: (a) x = 5 (b) x = -20 (c) x = -5

Question 2

Key idea: Expand brackets first, then collect like terms and isolate x.

1. Expand the left side: 6x - 12 = 2x + 8. 2. Subtract 2x from both sides: 4x - 12 = 8. 3. Add 12 to both sides: 4x = 20. 4. Divide both sides by 4: x = 5. 5. Check: 3(2(5) - 4) = 3(6) = 18 and 2(5) + 8 = 18. ✓

Answer: x = 5

Question 3

Key idea: Let the smallest number be n. Consecutive numbers are n, n + 1 and n + 2.

1. n + (n + 1) + (n + 2) = 87 2. 3n + 3 = 87, so 3n = 84 and n = 28 3. The numbers are 28, 29 and 30 (check: 28 + 29 + 30 = 87)

Answer: 28, 29 and 30

Question 4

Key idea: Multiply both sides by the denominator first, then solve the two-step equation.

1. Multiply by 3: 2x + 5 = 21 2. Subtract 5: 2x = 16 3. Divide by 2: x = 8

Answer: x = 8

Question 5

Key idea: To solve a linear equation, collect pronumerals on one side and constants on the other using inverse operations.

1. Start with the equation: 3x - 7 = 2x + 5 2. Subtract 2x from both sides: x - 7 = 5 3. Add 7 to both sides: x = 12 4. Check: 3(12) - 7 = 29 and 2(12) + 5 = 29 ✓

Answer: x = 12

Question 6

Key idea: Let t be the number of texts. Write the cost in dollars: 15 cents =0.15$.

1. 25 + 0.15t = 37.30 2. 0.15t = 12.30 3. t = 12.30 ÷ 0.15 = 82

Answer: 82 texts

Question 7

Key idea: Isolate the term containing x, then undo the multiplication or division.

1. (a) Multiply by 4: 3x = 36; divide by 3: x = 12 2. (b) Subtract 3: -x/5 = -2; multiply by -5: x = 10

Answer: (a) x = 12 (b) x = 10

Question 8

Key idea: Expand brackets, then collect like terms and isolate x.

1. Expand the left side: 4x + 12 = 3x + 17. 2. Subtract 3x from both sides: x + 12 = 17. 3. Subtract 12 from both sides: x = 5. 4. Check: 4(5 + 3) = 4(8) = 32 and 3(5) + 17 = 15 + 17 = 32. ✓

Question 9

Key idea: Let the brother's age be b, so Kate's age is 3b. Add 8 to both ages for the future.

1. In 8 years: Kate 3b + 8, brother b + 8 2. 3b + 8 = 2(b + 8) 3. 3b + 8 = 2b + 16, so b = 8 4. Kate is 3 × 8 = 24 (check: in 8 years, 32 = 2 × 16 ✓)

Answer: Brother 8 years, Kate 24 years

Question 10

Key idea: Perform the same operation on both sides until x is alone. A check confirms the left side equals the right side.

1. (a) Subtract 7: -2x = -16; divide by -2: x = 8. Check: 7 - 2(8) = 7 - 16 = -9 ✓ 2. (b) Multiply by 2: 5 - x = 12; subtract 5: -x = 7, so x = -7. Check: (5 - (-7))/(2) = 12/2 = 6 ✓ 3. (c) Subtract 1.2: 0.4x = 2.4; divide by 0.4: x = 6. Check: 0.4(6) + 1.2 = 2.4 + 1.2 = 3.6 ✓

Answer: (a) x = 8 (b) x = -7 (c) x = 6