Year 10 linear equations worksheet

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Name: _____ Date: _____

Question 1

Solve (x + 3)/(4) = 7.

Answer: _____

Question 2

Solve (x + 1)/(3) = (2x - 1)/(5).

Answer: _____

Question 3

Layla and her friend Marcus save up to buy a video game together. Marcus contributes $15 more than Layla. One quarter of Marcus's contribution covers the online activation fee, which costs $12. Let x represent Layla's contribution in dollars. Write an equation and solve it to find how much each person contributes.

Answer: _____

Question 4

Solve the equation (x+1)/(3) = (2x-1)/(5)

Answer: _____

Question 5

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

Answer: _____

Question 6

Solve 3(2x - 4) = 2(x + 6).

Answer: _____

Question 7

Solve (2x + 1)/(3) = (x - 2)/(4).

Answer: _____

Question 8

The formula for the perimeter of a rectangle is P = 2(l + w). A rectangular garden has a perimeter of 38 metres and a width of 7 metres. Find the length of the garden.

Answer: _____

Question 9

Solve for x: (2x - 3)/(5) = 7

Answer: _____

Question 10

Solve (3x + 1)/(4) = (x - 3)/(2).

Answer: _____

Year 10 linear equations: answers and worked solutions

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Question 1

Key idea: Multiply both sides by the denominator to eliminate the fraction, then solve.

1. Multiply both sides by 4:\ 4 × (x+3)/(4) = 7 × 4 x + 3 = 28 2. Subtract 3 from both sides:\ x = 25 3. **Check:** (25 + 3)/(4) = 28/4 = 7 ✓

Answer: x = 25

Question 2

Key idea: Find the LCD of both denominators, multiply every term by it to eliminate all fractions, then solve.

1. The LCD of 3 and 5 is 15. Multiply both sides by 15:\ 15 × (x+1)/(3) = 15 × (2x-1)/(5) 5(x + 1) = 3(2x - 1) 2. Expand the brackets:\ 5x + 5 = 6x - 3 3. Subtract 5x from both sides:\ 5 = x - 3 4. Add 3 to both sides:\ x = 8 5. **Check:** (8+1)/(3) = 9/3 = 3 and (2(8)-1)/(5) = 15/5 = 3 ✓

Answer: x = 8

Question 3

Key idea: Translate the real-life information into an equation involving an algebraic fraction, then solve by multiplying both sides by the denominator.

1. Marcus contributes x + 15 dollars. One quarter of Marcus's contribution equals 12, so:\ (x + 15)/(4) = 12 2. Multiply both sides by 4:\ x + 15 = 48 3. Subtract 15 from both sides:\ x = 33 4. Marcus's contribution: x + 15 = 33 + 15 = 48 dollars. 5. **Check:** 48/4 = 12 ✓

Answer: Layla contributes $33 and Marcus contributes $48.

Question 4

Key idea: Multiply both sides by the LCD to clear all fractions, then solve the resulting linear equation.

1. Find the LCD of 3 and 5: LCD = 15. 2. Multiply every term on both sides by 15:\ 15 × (x+1)/(3) = 15 × (2x-1)/(5) 3. Simplify each side:\ 5(x+1) = 3(2x-1) 4. Expand the brackets:\ 5x + 5 = 6x - 3 5. Solve for x:\ 5 + 3 = 6x - 5x 8 = x 6. Check by substituting x = 8 back into the original equation: (8+1)/(3) = 9/3 = 3 and (2(8)-1)/(5) = 15/5 = 3. Both sides are equal.

Answer: x = 8

Question 5

Key idea: Find the LCD of both denominators, multiply every term by it to eliminate all fractions, then solve.

1. The LCD of 5 and 3 is 15. Multiply both sides by 15:\ 15 × (2x-3)/(5) = 15 × (x+2)/(3) 3(2x - 3) = 5(x + 2) 2. Expand both sides:\ 6x - 9 = 5x + 10 3. Subtract 5x from both sides:\ x - 9 = 10 4. Add 9 to both sides:\ x = 19 5. **Check:** (2(19)-3)/(5) = 35/5 = 7 and (19+2)/(3) = 21/3 = 7 ✓

Question 6

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

1. Expand: 6x - 12 = 2x + 12 2. Subtract 2x from both sides: 4x - 12 = 12 3. Add 12 to both sides: 4x = 24 4. Divide both sides by 4: x = 6

Check: 3(2(6)-4) = 3(8) = 24 and 2(6+6) = 2(12) = 24 ✓

Answer: x = 6

Question 7

Key idea: Multiply both sides by the lowest common multiple of the denominators to eliminate fractions.

1. The LCM of 3 and 4 is 12. Multiply both sides by 12:\ 4(2x + 1) = 3(x - 2) 2. Expand: 8x + 4 = 3x - 6 3. Subtract 3x from both sides: 5x + 4 = -6 4. Subtract 4 from both sides: 5x = -10 5. Divide both sides by 5: x = -2

Check: LHS = (2(-2)+1)/(3) = -3/3 = -1 and RHS = (-2-2)/(4) = -4/4 = -1 ✓

Answer: x = -2

Question 8

Key idea: Substitute the known values into the formula, then solve the resulting linear equation for the unknown.

1. Substitute P = 38 and w = 7: 38 = 2(l + 7) 2. Divide both sides by 2: 19 = l + 7 3. Subtract 7 from both sides: l = 12

Check: 2(12 + 7) = 2(19) = 38 ✓

Answer: The length of the garden is 12 metres.

Question 9

Key idea: Multiply both sides by the denominator to eliminate the fraction, then isolate x.

1. Start with (2x - 3)/(5) = 7. 2. Multiply both sides by 5: 2x - 3 = 35. 3. Add 3 to both sides: 2x = 38. 4. Divide both sides by 2: x = 19. 5. Check: (2(19) - 3)/(5) = 35/5 = 7 ✓

Answer: x = 19

Question 10

Key idea: Multiply both sides by the lowest common multiple of the denominators to eliminate fractions.

1. The LCM of 4 and 2 is 4. Multiply both sides by 4:\ 3x + 1 = 2(x - 3) 2. Expand the right side: 3x + 1 = 2x - 6 3. Subtract 2x from both sides: x + 1 = -6 4. Subtract 1 from both sides: x = -7

Check: LHS = (3(-7)+1)/(4) = -20/4 = -5 and RHS = (-7-3)/(2) = -10/2 = -5 ✓