Year 8 linear equations worksheet

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Name: _____ Date: _____

Question 1

Solve 3x + 7 = 22.

Answer: _____

Question 2

Solve 5x - 8 = 17 and check your answer.

Answer: _____

Question 3

Solve for x: (x + 3)/(4) = 5.

Answer: _____

Question 4

Solve 7x - 4 = 3x + 20.

Answer: _____

Question 5

Solve 4(x - 3) = 20.

Answer: _____

Question 6

Solve:

(a) x - 9 = -4

(b) 7x = -56

(c) 4x + 11 = 3

Answer: _____

Question 7

Solve 12 - 3x = 21.

Answer: _____

Question 8

Solve:

(a) x/5 + 4 = 9

(b) 2x/3 = 8

Answer: _____

Question 9

Solve 2x + 9 = 5x - 12.

Answer: _____

Question 10

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

Answer: _____

Year 8 linear equations: answers and worked solutions

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Question 1

Key idea: Use inverse operations to isolate x, undoing addition before division.

1. Subtract 7 from both sides: 3x + 7 - 7 = 22 - 7 implies 3x = 15 2. Divide both sides by 3: x = 15/3 = 5 3. Check by substituting back: 3(5) + 7 = 15 + 7 = 22 ✓

Answer: x = 5

Question 2

Key idea: Form equivalent equations by doing the same operation to both sides.

1. Add 8 to both sides: 5x = 25 2. Divide both sides by 5: x = 5 3. Check: 5 × 5 - 8 = 17 ✓

Answer: x = 5

Question 3

Key idea: Undo each operation in reverse order to isolate the pronumeral.

1. Multiply both sides by 4: (x+3)/(4) × 4 = 5 × 4, giving x + 3 = 20. 2. Subtract 3 from both sides: x + 3 - 3 = 20 - 3. 3. Simplify: x = 17. 4. Check by substituting back: (17 + 3)/(4) = 20/4 = 5 ✓

Answer: x = 17

Question 4

Key idea: Collect the pronumeral terms on one side by subtracting the smaller one from both sides.

1. Subtract 3x from both sides: 4x - 4 = 20 2. Add 4: 4x = 24, so x = 6 3. Check: 7 × 6 - 4 = 38 and 3 × 6 + 20 = 38 ✓

Answer: x = 6

Question 5

Key idea: Either expand the brackets first, or divide both sides by the number outside the brackets.

1. Divide both sides by 4: x - 3 = 5 2. Add 3: x = 8 3. Check: 4 × (8 - 3) = 20 ✓

Answer: x = 8

Question 6

Key idea: Undo each operation by doing the opposite operation to both sides.

1. (a) Add 9 to both sides: $x = -4 + 9 = 5$ 2. (b) Divide both sides by 7: $x = -56 \div 7 = -8$ 3. (c) Subtract 11: $4x = -8$; divide by 4: $x = -2$

Answer: (a) $x = 5$ (b) $x = -8$ (c) $x = -2$

Question 7

Key idea: Keep the sign with each term: $-3x$ means -3 times x.

1. Subtract 12 from both sides: $-3x = 9$ 2. Divide both sides by -3: $x = -3$ 3. Check: $12 - 3 \times (-3) = 12 + 9 = 21$ ✓

Answer: $x = -3$

Question 8

Key idea: Undo addition and subtraction first, then multiply both sides by the denominator.

1. (a) Subtract 4: $x/5 = 5$; multiply by 5: $x = 25$ 2. (b) Multiply by 3: $2x = 24$; divide by 2: $x = 12$

Answer: (a) $x = 25$ (b) $x = 12$

Question 9

Key idea: Subtract the smaller x term from both sides so the x coefficient stays positive.

1. Subtract $2x$ from both sides: $9 = 3x - 12$ 2. Add 12: $21 = 3x$, so $x = 7$ 3. Check: $2 \times 7 + 9 = 23$ and $5 \times 7 - 12 = 23$ ✓

Answer: $x = 7$

Question 10

Key idea: Expand both sides, then collect the pronumeral terms on one side.

1. Expand: $6x + 3 = 5x + 10$ 2. Subtract $5x$: $x + 3 = 10$, so $x = 7$ 3. Check: $3 \times 15 = 45$ and $5 \times 9 = 45$ ✓

Answer: $x = 7$