

Boost Free Lessons - Year 9 Maths

Lesson 1: Variables on One Side

Name: _____ Grade: _____ Date: _____

Worked Example 1

Solve $4x + 7 = 23$

1. The variable appears once, so work backwards through the operations.
2. Undo the addition first: subtract 7 from both sides, giving $4x = 16$.
3. Undo the multiplication: divide both sides by 4.
4. Check by substituting back: $4 \times 4 + 7 = 23$ (correct).

$x = 4$

Worked Example 2

Solve $\frac{3x - 5}{2} = 8$

1. Clear the fraction first by multiplying **both sides** by the denominator, 2.
2. That gives $3x - 5 = 16$.
3. Add 5 to both sides: $3x = 21$.
4. Divide both sides by 3.

$x = 7$

Remember: Undo the operations in reverse order. If the equation contains a fraction, clear it first by multiplying both sides by the denominator.



Question 1: Solve the following equations.

1. $3x + 5 = 20$

2. $7y - 4 = 24$

3. $5a + 12 = 2$

4. $2k - 9 = 15$

5. $6n + 11 = 11$

6. $9p - 7 = 38$

7. $4t + 19 = 3$

8. $8c - 24 = 0$

9. $10w + 6 = -24$

10. $12d - 5 = 43$



Question 2: Solve the following equations.

1. $\frac{x}{3} + 4 = 9$

2. $\frac{2x+1}{3} = 5$

3. $\frac{m-4}{5} = 3$

4. $\frac{3y}{4} = 9$

5. $\frac{5k-2}{4} = 7$

6. $\frac{a}{2} - 7 = -3$

7. $\frac{4p+6}{2} = 11$

8. $\frac{t+9}{6} = 2$



Question 3: Answer the following questions.

1. A rectangle has a perimeter of 58 cm and a width of 11 cm. Write an equation and find its length.
2. A gym charges a \$55 joining fee plus \$38 per week. A member has paid \$359. Write an equation and find how many weeks they have been a member.
3. Five times a number, less 13, is 42. Write an equation and find the number.
4. The average of a number and 17 is 25. Write an equation and find the number.
5. A triangle has angles of x° , $(x + 20)^\circ$ and $2x^\circ$. Write an equation and find x .





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Answers: Variables on One Side**Question 1**

1. $x = 5$

2. $y = 4$

3. $a = -2$

4. $k = 12$

5. $n = 0$

6. $p = 5$

7. $t = -4$

8. $c = 3$

9. $w = -3$

10. $d = 4$

Question 2

1. $x = 15$

2. $x = 7$

3. $m = 19$

4. $y = 12$

5. $k = 6$

6. $a = 8$

7. $p = 4$

8. $t = 3$

Question 3

1. $2L + 22 = 58$, so $L = 18$ cm

2. $55 + 38w = 359$, so $w = 8$ weeks

3. $5n - 13 = 42$, so $n = 11$

4. $\frac{n + 17}{2} = 25$, so $n = 33$

5. $4x + 20 = 180$, so $x = 40$

