

Boost Free Lessons - Year 10 Maths

Lesson 4: Solving Quadratics by Factorising

Name: _____ Grade: _____ Date: _____

Worked Example 1

Solve $x^2 + 7x + 10 = 0$

1. Factorise the left-hand side. Two numbers that multiply to 10 and add to 7 are 2 and 5.
2. That gives $(x + 2)(x + 5) = 0$.
3. Use the Null Factor Law: if two things multiply to give zero, at least one of them must be zero.
4. So $x + 2 = 0$ or $x + 5 = 0$.

$x = -2$ or $x = -5$

Worked Example 2

Solve $x^2 = 6x$

1. Never divide both sides by x , because you would lose one of the solutions.
2. Move everything to one side so it equals zero: $x^2 - 6x = 0$.
3. Factorise by taking out the common factor x : $x(x - 6) = 0$.
4. So $x = 0$ or $x - 6 = 0$.

$x = 0$ or $x = 6$

Remember: Always rearrange so one side equals zero before factorising. A quadratic usually has two solutions, and sometimes one repeated solution.



Question 1: Solve the following equations.

1. $(x + 1)(x + 4) = 0$

2. $(x - 3)(x + 2) = 0$

3. $x(x - 5) = 0$

4. $(2x - 1)(x + 3) = 0$

5. $x^2 + 5x + 6 = 0$

6. $x^2 - 7x + 12 = 0$

7. $x^2 + 2x - 15 = 0$

8. $x^2 - x - 6 = 0$

9. $x^2 - 9 = 0$

10. $x^2 + 8x = 0$



Question 2: Solve the following equations.

1. $x^2 = 4x$

2. $x^2 - 16 = 0$

3. $x^2 + 6x + 9 = 0$

4. $x^2 - 10x + 21 = 0$

5. $x^2 + x - 12 = 0$

6. $2x^2 - 8 = 0$

7. $x^2 - 5x = 0$

8. $x^2 + 4x - 21 = 0$



Question 3: Answer the following questions.

1. A rectangle has length $(x + 3)$ and width x , and an area of 40 cm^2 . Write an equation and find x .
2. Solve $x^2 - 3x - 10 = 0$.
3. The product of a number and 4 more than itself is 45. Find the possible numbers.
4. Solve $x^2 = 49$.
5. Explain why you should not divide both sides of $x^2 = 5x$ by x .





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Answers: Solving Quadratics by Factorising**Question 1**

1. $x = -1$ or $x = -4$
2. $x = 3$ or $x = -2$
3. $x = 0$ or $x = 5$
4. $x = \frac{1}{2}$ or $x = -3$
5. $x = -2$ or $x = -3$
6. $x = 3$ or $x = 4$
7. $x = -5$ or $x = 3$
8. $x = 3$ or $x = -2$
9. $x = 3$ or $x = -3$
10. $x = 0$ or $x = -8$

Question 2

1. $x = 0$ or $x = 4$
2. $x = 4$ or $x = -4$
3. $x = -3$ (a repeated solution)
4. $x = 3$ or $x = 7$
5. $x = -4$ or $x = 3$
6. $x = 2$ or $x = -2$
7. $x = 0$ or $x = 5$
8. $x = -7$ or $x = 3$

Question 3

1. $x^2 + 3x - 40 = 0$, giving $x = 5$ ($x = -8$ is rejected as a length)
2. $x = 5$ or $x = -2$
3. $n = 5$ or $n = -9$
4. $x = 7$ or $x = -7$
5. You would lose the solution $x = 0$.

