

Quadratic equations: 3 methods

PRACTICE SHEET



MATHS · TECH · IDEAS

Goes with the video "Quadratic Equations: 3 Methods to Solve Any Quadratic". Name: _____

Date: _____

A. Factorisation (split the middle term)

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

Find two numbers that multiply to 12 and add to -7 .

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

3. $2x^2 + 7x + 3 = 0$

Here $a \times c = 6$, not 3.

B. Quadratic formula (find the discriminant first)

4. $3x^2 - 5x - 2 = 0$

5. $x^2 - 4x + 4 = 0$

What does $D = 0$ tell you about the roots?

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

Compute D before anything else.

C. Completing the square

7. $x^2 + 8x + 7 = 0$

8. $x^2 - 10x + 9 = 0$

Half of -10 is -5 . Watch the sign inside the bracket.

D. Think before you solve (tricky)

9. The roots of $x^2 - 5x + k = 0$ differ by 3. Find k , without solving for x first.

10. In $x^2 - 6x + k = 0$ one root is twice the other. Find k and both roots.

11. For which values of k does $kx^2 + 4x + 1 = 0$ have **no** real roots?

Check every root by putting it back into the original equation. **One step at a time, to the top.**



Answer key

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#	Answer	Key step
1	$x = 3$ or $x = 4$	$(x - 3)(x - 4)$
2	$x = 3$ or $x = -4$	$(x - 3)(x + 4)$
3	$x = -1/2$ or $x = -3$	$(2x + 1)(x + 3)$
4	$x = 2$ or $x = -1/3$	$D = 25 + 24 = 49$, $x = (5 \pm 7)/6$
5	$x = 2$ (one repeated root)	$D = 0$, $(x - 2)^2 = 0$
6	No real roots	$D = 4 - 20 = -16 < 0$
7	$x = -1$ or $x = -7$	$(x + 4)^2 = 9$
8	$x = 1$ or $x = 9$	$(x - 5)^2 = 16$
9	$k = 4$	Roots r and $r + 3$; sum $2r + 3 = 5$, so $r = 1$; roots 1 and 4, product 4
10	$k = 8$; roots 2 and 4	Roots r and $2r$; sum $3r = 6$, so $r = 2$; product 8
11	$k > 4$	$D = 16 - 4k < 0$. ($k = 4$ gives one repeated root.)

Stuck on a method? Watch the video again and try the question before reading the key. **One step at a time, to the top.**