

Foundation GCSE: Solving Quadratic Equations

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. Solve $x^2 + 5x + 6 = 0$.
2. Solve $x^2 + 7x + 12 = 0$.
3. Solve $x^2 - 7x + 10 = 0$.
4. Solve $x^2 + 2x - 15 = 0$.
5. Solve $x^2 - 3x - 18 = 0$.
6. Solve $x^2 - 9 = 0$.
7. Solve $x^2 - 16 = 0$.
8. Solve $x^2 - 8x + 16 = 0$.
9. Solve $2x^2 + 6x = 0$.
10. Solve $x^2 + 9x + 20 = 0$.
11. Solve $x^2 - 5x - 24 = 0$.
12. Solve $2x^2 + 7x + 3 = 0$.
13. Solve $3x^2 + 10x + 8 = 0$.
14. Solve $2x^2 - 5x - 3 = 0$.
15. Solve $x^2 + 4x = 12$ (by rearranging and factorising).
16. Solve $x^2 = 5x + 14$.
17. Solve $2x^2 - 8 = 0$.
18. Solve $3x^2 - 12x = 0$.
19. Solve $x^2 + 6x + 8 = 0$ using the quadratic formula (or factorising).
20. Solve $x^2 - 2x - 8 = 0$.

Answers & Worked Solutions

1. $x = -2$ or $x = -3$
Factorise: $(x + 2)(x + 3) = 0$, so $x = -2$ or $x = -3$.
2. $x = -3$ or $x = -4$
Factorise: $(x + 3)(x + 4) = 0$, so $x = -3$ or $x = -4$.
3. $x = 2$ or $x = 5$
Factorise: $(x - 2)(x - 5) = 0$, so $x = 2$ or $x = 5$.
4. $x = 3$ or $x = -5$
Factorise: $(x + 5)(x - 3) = 0$, so $x = 3$ or $x = -5$.
5. $x = 6$ or $x = -3$
Factorise: $(x - 6)(x + 3) = 0$, so $x = 6$ or $x = -3$.
6. $x = 3$ or $x = -3$
Difference of two squares: $(x - 3)(x + 3) = 0 \implies x = \pm 3$.
7. $x = 4$ or $x = -4$
Difference of two squares: $(x - 4)(x + 4) = 0 \implies x = \pm 4$.
8. $x = 4$ (repeated)
Factorise: $(x - 4)^2 = 0 \implies x = 4$.
9. $x = 0$ or $x = -3$
Factorise out $2x$: $2x(x + 3) = 0 \implies x = 0$ or $x = -3$.
10. $x = -4$ or $x = -5$
Factorise: $(x + 4)(x + 5) = 0 \implies x = -4$ or $x = -5$.
11. $x = 8$ or $x = -3$
12. $x = -3$ or $x = -\frac{1}{2}$
Factorise: $(2x + 1)(x + 3) = 0 \implies x = -3$ or $x = -\frac{1}{2}$.
13. $x = -2$ or $x = -\frac{4}{3}$
Factorise: $(3x + 4)(x + 2) = 0 \implies x = -2$ or $x = -\frac{4}{3}$.
14. $x = 3$ or $x = -\frac{1}{2}$
Factorise: $(2x + 1)(x - 3) = 0 \implies x = 3$ or $x = -\frac{1}{2}$.
15. $x = 2$ or $x = -6$
Rearrange to $x^2 + 4x - 12 = 0 \implies (x + 6)(x - 2) = 0 \implies x = 2, -6$.
16. $x = 7$ or $x = -2$
Rearrange to $x^2 - 5x - 14 = 0 \implies (x - 7)(x + 2) = 0 \implies x = 7, -2$.
17. $x = 2$ or $x = -2$
Divide by 2: $x^2 - 4 = 0 \implies (x - 2)(x + 2) = 0 \implies x = \pm 2$.
18. $x = 0$ or $x = 4$
Factorise $3x(x - 4) = 0 \implies x = 0$ or $x = 4$.
19. $x = -2$ or $x = -4$
Factorise: $(x + 2)(x + 4) = 0 \implies x = -2, -4$.
20. $x = 4$ or $x = -2$
Factorise: $(x - 4)(x + 2) = 0 \implies x = 4$ or $x = -2$.