

QUADRATIC EQUATIONS

CANSU OLCE

A STAR MATHS (www.astarmaths.com.au)

1. Solve $k^2 + 3k = 0$

2. Solve $w^2 - 10w + 25 = 0$

3. Factorise $15h^2 - 23h + 4$

4. Factorise $16d^2 + 40d + 25$

5. Factorise $6y^2 + y - 40$

6. Solve $(5 - 7e)(1 - e) = 0$

7. Solve $2y^2 + 7y + 6$

8. Solve $16 - 8w - 3w^2 = 0$

9. Solve $h^2 + 2h - 5 = 0$ by completing square.

10. Solve $3f^2 + 4f - 6 = 0$ by completing square.

11. Solve $2x^2 + 5x - 7 = 0$ by completing square.

12. Solve $5w^2 - 4w - 3 = 0$ by completing square.

13. Solve $4e^2 - e - 4 = 0$ by completing square.

14. Solve $3c^2 + 2c - 2 = 0$ by using the quadratic formula.

15. Solve $6a^2 = 9 - 4a$ by using the quadratic formula.

16. Solve $(x - 6)^2 = 3$ by using the quadratic formula.

17. Solve $2m^4 - 19m^2 + 24 = 0$

18. Solve $x^6 - 6x^3 - 16 = 0$

19. $-2x^2 + 8x - 8 = 0$
Find x .

20. $x(x - 2) = 3(x - 2)$
Find x .

21. $x^2 - 2(m + 1)x + 2m - 6 = 0$
If one root is -2 , find m .

22. x_1 and x_2 are the roots of $x^2 - 6x + 2m - 1 = 0$
If $x_1 = x_2$, find m .

23. x_1 and x_2 are the roots of $x^2 - 4x - 6 = 0$

Find $\frac{3}{x_1} + \frac{3}{x_2}$

24. x_1 and x_2 are the roots of $x^2 + 6x + 3 = 0$

Find $x_1^2 + x_2^2$.

25. x_1 and x_2 are the roots of $x^2 - 6x + 3m + 5 = 0$

If $2x_1 - x_2 = 15$, find m .

26. x_1 and x_2 are the roots of $x^2 - 3x + m = 0$

If $x_1^2 - x_2^2 = 15$, find m .

27. x_1 and x_2 are the roots of $x^2 - 13x + 36 = 0$

Find $\sqrt{x_1} + \sqrt{x_2}$

28. $-2(x - 3)(x + 4) = x + 4$

Find x .

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

Find x .

30. $\frac{x - 2}{x + 1} + \frac{x - 2}{x - 3} = 0$

31. $\frac{6}{1 + \frac{3}{x + \frac{2}{x}}} = 3$

Find the possible x values.

32. $\frac{x^2 - 3x - 10}{x^2 - 4} = 0$

Find x value.

33. $\frac{x^3 - 4x}{x - 2} = 0$

Find x value.

34. $\frac{1}{x^2 + 3x + 2} + \frac{1}{x + 2} = \frac{1}{4}$

Find x value.

35. $\sqrt{x + 10} = x + 4$

Find x value.

36. A garden is in the shape of a rectangle and its length is 4 m longer than its width. If the area of the garden is 96 m^2 , find the dimensions of the garden.

37. A park is in the shape of a right-angled triangle, with its base 5 m longer than its perpendicular height. If the area of the park is 700 m^2 , find the dimensions of the park.

38. A rectangular block of land has its width 18 m shorter than its length. If the area of the block is 1008 m^2 , find the dimensions of the block of land.

39. A block of land is in the shape of a rectangle with its width 20 m shorter than its length. If the area of the block is 2204 m^2 , find the length and width of the block of land.

40. A golf ball is thrown upwards and its height, h metres, after t seconds is given by the formula $h = 18t - 5t^2$. At what times did the ball reach a height of 8 m?

41. After jumping from a plane, the height (in metres) of a skydiver above the ground is given by $h = 4000 - 5t^2$, where t is the time (in seconds) after jumping.
- How high was the plane at the moment the skydiver jumped?
 - What was the skydiver's height after 20 seconds?
 - The skydiver opened his parachute at 1000 m. How long did it take the skydiver to reach this height?
42. The sum of a number and its square is 72. What is the number?
43. The product of two consecutive integers is 600. Find the integers.
44. When a positive number is subtracted from its square, the result is 1190. What is the number?
45. The difference between two positive integers is 12 and their product is 405. Find the integers.

ANSWER KEY

1. -3,0
2. 5
3. $(5h-1)(3h-4)$
4. $(4d + 5)^2$
5. $(3y+8)(2y-5)$
6. $5/7, 1$
7. $(2y+2)(y+3)$
8. $(3w-4)(w+4)$
9. $-1 \mp \sqrt{6}$
10. $-\frac{2}{3} \mp \frac{\sqrt{22}}{3}$
11. $1, -7/2$
12. $\frac{2}{5} \mp \frac{\sqrt{19}}{5}$
13. $\frac{1}{8} \mp \frac{\sqrt{65}}{8}$
14. $-\frac{1}{3} \mp \frac{\sqrt{7}}{3}$
15. $-\frac{1}{3} \mp \frac{\sqrt{58}}{6}$
16. $6 \mp \sqrt{3}$
17. $\sqrt{\frac{3}{2}}, 2\sqrt{2}$
18. $\sqrt[3]{2}, 2$
19. 2
20. 2,3
21. -8
22. 5
23. -2
24. 30
25. -4
26. -4
27. 5
28. -4, $5/2$
29. -2,3
30. 1, 2
31. 1,2
32. -2,5
33. -2,0
34. 3

35. -6, -1

36. 8, 12

37. $-\frac{5}{2} \pm \frac{5\sqrt{113}}{2}$

38. 42, 24

39. $1+21\sqrt{5}, 21\sqrt{5} - 19$

40. $\frac{9}{5} \pm \frac{\sqrt{41}}{5}$

41. a) 4000 b) 2000 c) $10\sqrt{6}$

42. -9, 8

43. 24, 25

44. 35

45. a=27, b=15

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