

Quadratics

Exercise A

1. The quadratic equation $2x^2 - 6x + k = 0$, where k is a constant, has repeated real roots. Find the value of k .

2. (a) Find the discriminant of $kx^2 - 4x + k$ in terms of k .
(b) The quadratic equation $kx^2 - 4x + k = 0$ has equal roots. Find the possible values of k .

3. (i) Calculate the discriminant of $-2x^2 + 7x + 3$ and hence state the number of real roots of the equation $-2x^2 + 7x + 3 = 0$. [3]
(ii) The quadratic equation $2x^2 + (p + 1)x + 8 = 0$ has equal roots. Find the possible values of p . [4]

4. The equation $kx^2 + 4x + (5 - k) = 0$, where k is a constant, has 2 different real solutions for x .
(a) Show that k satisfies $k^2 - 5k + 4 > 0$. (3)
(b) Hence find the set of possible values of k . (4)

5. Given that the quadratic equation $2x^2 + 6x - k = 0$ has two distinct real roots, find the possible set of values of the constant k .

6. The quadratic equation $x^2 + 4x - 2m = 0$ has no real solutions. Find the possible range of values of m .

7. (a) Find the discriminant of the quadratic expression $px^2 - 3x + 5$ in terms of p .
(b) Hence find the set of possible values of p for which the quadratic equation $px^2 - 3x + 5 = 0$ has no solutions.

8. Find the value of the constant q such that the quadratic equation $qx^2 - 6x + q = 0$ has equal roots.

Exercise B

Sketch the following quadratic graphs.

1. $y = x^2 - 8x + 12$

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

3. $y = x^2 - 5x - 14$

4. $y = x^2 - 4x + 1$

5. $y = x^2 + 10x - 3$

6. $y = x^2 - 5x$

7. $y = 2x^2 - x - 3$

8. $y = 3x^2 - 4x - 4$

9. $y = 2x^2 - 12x$

10. $y = x^2 - 9$

11. $y = x^2 - 25$

12. $y = 2x^2 - 15$

13. $y = x^2 + 2x + 10$

14. $y = x^2 - x + 5$

15. $y = -x^2 + 4x - 20$

16. $y = -2x^2 + 3x - 15$

Exercise C

Solve the following equations:

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

2. $x^4 - 3x^2 - 10 = 0$

3. $2x^6 + 9x^3 + 4 = 0$

4. $2x^{1/2} - x^{1/4} - 3 = 0$

5. $3x^{1/3} - 9x^{1/6} = 0$
