QUADRATIC INEQUALITIES | KEY POINTS

- Rearrange the inequality until one is zero.
- Find the *critical values* and *sketch the graph*.
- Use the graph to determine the inequality.

QUADRATIC INEQUALITIES | PRACTICE PROBLEMS

1A. Solve the inequality $x^2 - 6x - 7 > 0$.

1B. Solve the inequality $5 + 3x - 2x^2 \geq 1 - 4x$.

QUADRATIC SIMULTANEOUS INEQUALITIES | EXAMPLE-PROBLEM PAIR

2E. Find the set of values of x which satisfy both

$5x - 10 > 4x - 7$ and $2x^2 - 11x + 5 < 0$

2P. Find the set of values of x which satisfy both
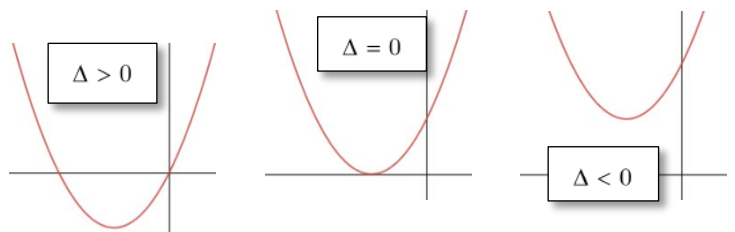
$x^2 + 5x - 6 < 0$ and $x^2 + 3x - 4 < 0$

THE DISCRIMINANT | KEY POINTS

- The discriminant is the part under the square root in the quadratic formula. $\Delta = b^2 - 4ac$
- For a quadratic equation $ax^2 + bx + c = 0$,
  - $\Delta > 0 \Rightarrow$ the equation has *two distinct real roots*.
  - $\Delta = 0 \Rightarrow$ the equation has *repeated roots*.
  - $\Delta < 0 \Rightarrow$ the equation has *no real roots*.

THE DISCRIMINANT | EXAMPLE-PROBLEM PAIR 1

3E. Find the exact value of k for which the quadratic equation

$kx^2 + (k+2)x + 3 = 0$ has a repeated root.

3P. Given that $kx^2 - 2x + 3 - 2k = 0$ has equal roots, find the possible values of k.

THE DISCRIMINANT | EXAMPLE-PROBLEM PAIR 2

4E. Find the set of values of k for which

$2x^2 - (k+1)x + 5 - k = 0$ has two distinct real roots.

4P. The equation $3x^2 + kx - x + 3 = 0$ has no real roots.
Find the set of possible values of k.

HIDDEN QUADRATICS | EXAMPLE-PROBLEM PAIRS

5E. Solve the equation $x^4 - 3x^2 - 4 = 0$.

5P. Solve the equation $x^4 - 17x^2 + 16 = 0$.

6E. Solve the equation $\sqrt{x} + \dfrac{10}{\sqrt{x}} = 7$

6P. Solve the equation $2x^2 = \dfrac{3}{x^2} - 1$.

7E. Solve the equation $5^{2x+1} - 26 \times 5^x + 5 = 0$

7P. Solve the equations $4^x - 10 \times 2^x + 16 = 0$
Hint: Try writing 4^x as a power of 2.