

Nature of Roots (Discriminant)

N5 Maths Exam Questions

Source: 2018 P1 Q8 N5 Maths

(1) Determine the nature of the roots of the function $f(x) = 2x^2 + 4x + 5$.

Answer: *There are no real roots as discriminant = -24*

Source: 2016 P1 Q6 N5 Maths

(2) Determine the nature of the roots of the function $f(x) = 7x^2 + 5x - 1$.

Answer: *Roots are real and distinct*

Source: Specimen P2 Q12 N5 Maths

(3) Find the range of values of p such that the equation $px^2 - 2x + 3 = 0$, $p \neq 0$, has no real roots.

Answer: $p > \frac{1}{3}$

Source: Practice Paper A P1 Q9 N5 Maths

(4) A parabola has equation $y = x^2 - 3x + 7$.

Using the discriminant, determine the nature of its roots.

Answer: $b^2 - 4ac = -19 < 0$, therefore no real roots

Source: Practice Paper E P2 Q10 N5 Maths

(5) Find the range of values of k such that the equation $kx^2 - 4x + 2 = 0$, $k \neq 0$, has real roots.

Answer: $k \leq 2$

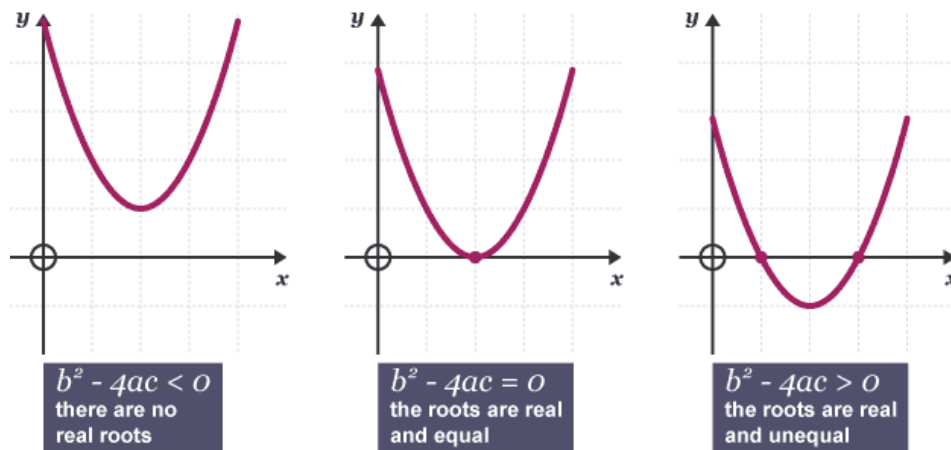
Discriminant

An exam question on the Discriminant to find the ‘Nature of Roots’ is.

“Find the range of values of p such that the equation $px^2 - 2x + 3 = 0$, $p \neq 0$, has no real roots”.

Source: N5 Maths, Specimen, P2, Q12

Consider the three possible combinations:



The points where the graph cuts the x-axis are called ‘the roots’.

The discriminant $b^2 - 4ac$ is used to find the ‘nature of the roots’.

The trinomial is compared with $ax^2 + bx + c$ to find a , b & c which are then substituted into $b^2 - 4ac$ to obtain a value.

The wording is important:

- $b^2 - 4ac > 0$ Roots are real and distinct
- $b^2 - 4ac = 0$ Roots are real and equal
- $b^2 - 4ac < 0$ No real roots
- “2 roots” is not accepted