

Discriminant and Sum and Product of Roots

The discriminant tells about the roots of any quadratic equation when the quadratic is in standard form.

Standard form of a quadratic:

$$f(x)=Ax^2+Bx+C \text{ or } 0=Ax^2+Bx+C$$

The discriminant, D, is equal to:

$$D=B^2-4AC$$

If $D < 0$	Two imaginary roots (Graph never crosses x-axis)
If $D = 0$	One real root (Graph touches x-axis in one place)
If $D > 0$ and \sqrt{D} is a whole number	Two real <u>rational</u> roots (Graph crosses x-axis twice)
If $D > 0$ and \sqrt{D} is not a whole number	Two real <u>irrational</u> roots (Graph crosses x-axis twice)

If a quadratic is in standard form:

The sum of the roots will be:

$$-\frac{B}{A}$$

The product of the roots will be:

$$\frac{C}{A}$$