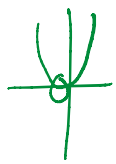
From the QUADRATIC FORMULA

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

the info under the radical "b^2-4ac" is called the <u>discriminant</u> and can determine the "<u>nature</u>" of the roots (xint) without solving.
You will know how many answers.

Ⓐ $x^2+2x+1=0$

$$x = \frac{-2 \pm \sqrt{4-4}}{2} \quad =0$$

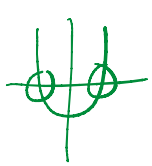


$$x = \frac{-2 \pm \sqrt{0}}{2} = \frac{-2 \pm 0}{2} = \frac{-2}{2} = -1$$

1 answer

Ⓑ $x^2+4x+3=0$

$$x = \frac{-4 \pm \sqrt{16-12}}{2} \quad >0$$



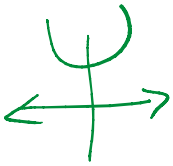
$$x = \frac{-4 \pm 2}{2} \quad \begin{cases} \frac{-4+2}{2} = -1 \\ \frac{-4-2}{2} = -3 \end{cases}$$

2 answers

Ⓒ $x^2+5x+7=0$

$$x = \frac{-5 \pm \sqrt{25-28}}{2} \quad <0$$

$$x = \frac{-5 \pm \sqrt{25-28}}{2}$$



$$x = \frac{-5 \pm \sqrt{-3}}{2}$$ Does NOT EXIST

NO REAL SOLUTION

then $b^2 - 4ac = 0$ 1 real solution

> 0 2 real + distinct solutions

< 0 no real solution

ex.1 Determine the nature of the roots given

$$2x^2 + 3x + 10 = 0$$

$$b^2 - 4ac$$

$$9 - 4(2)(10)$$

$$9 - 80 = -71$$

value of disc.

nature
no real solution

2. Find k if $x^2 - 6x + k = 0$ and it has two distinct real roots.

$$b^2 - 4ac > 0$$

$$(-6)^2 - 4(1)(k) > 0$$

$$36 - 4k > 0$$

-36 $\quad$ -36

$-36 \qquad\qquad -36$

$$\frac{-4k}{-4} > \frac{-36}{-4}$$

when x or ÷ by a negative MUST CHANGE THE INEQUALITY

$$\boxed{k < 9}$$

$\boxed{\text{p 251 \# 4–10, 13 choose a or b}}$