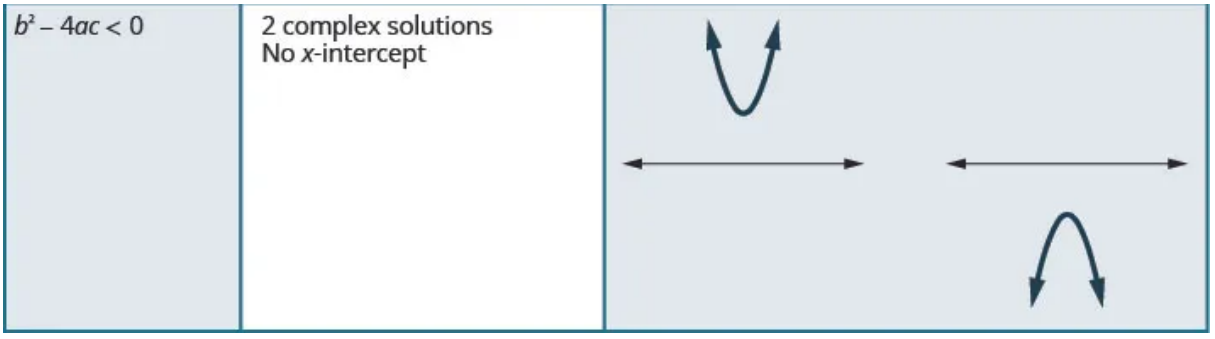
# the discriminant of a quadratic function

The quadratic formula

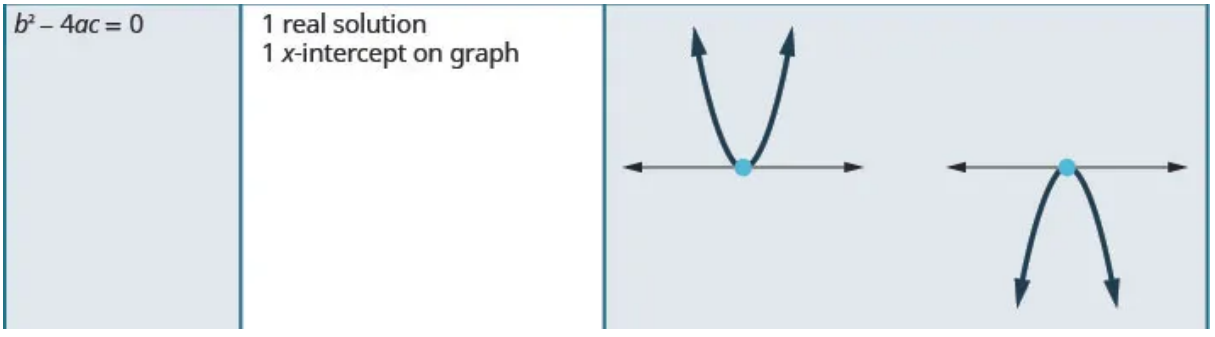
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The discriminant is $b^2 - 4ac$

If $b^2 - 4ac < 0$, then the equation has no real roots.




If $b^2 - 4ac = 0$, then equation has one real root. You can use $-\frac{b}{2a}$ to find the root **only** if it is a repeated root/one real root.




If $b^2 - 4ac < 0$, then the equation has 2 real roots.

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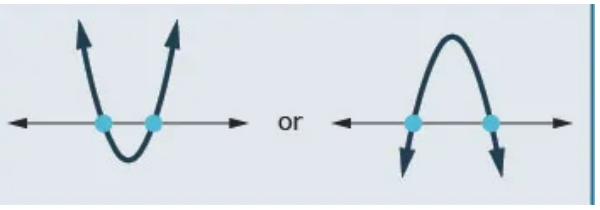
|---|---|---|
| $b^2 - 4ac > 0$ | 2 real solutions<br>2 $x$-intercepts on graph |  |