Scribe notes 8/31

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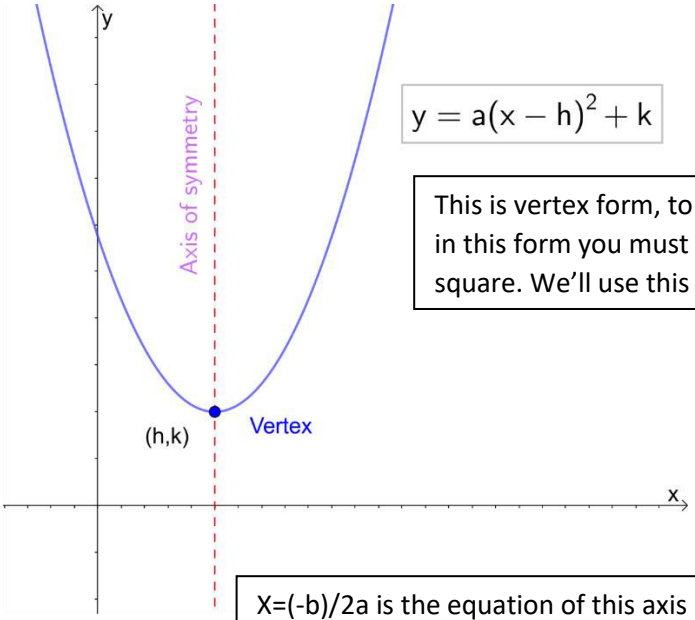
Quadratic formula:

To solve $0 = ax^2 + bx + c$ one can use the equation:

Quadratic Formula

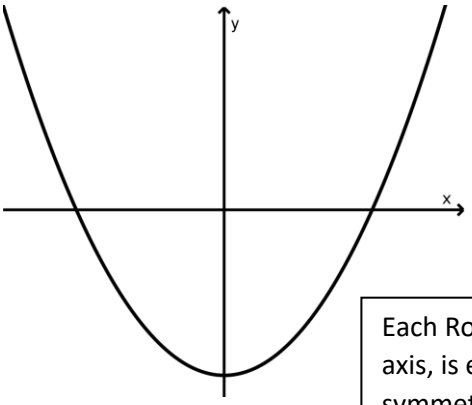
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



$$y = a(x - h)^2 + k$$

This is vertex form, to get an equation in this form you must complete the square. We'll use this later.

X=(-b)/2a is the equation of this axis of symmetry.



Each Root, or intersection with the x axis, is equidistant from this axis of symmetry this distance is $(\sqrt{(b^2) - 4ac}\,)/2a$

PROOF

$ax^2+bx+c=0$ /a

$x^2+(bx)/a+(c/a) =0$ move c/a to other side

$x^2+(bx)/a= -c/a$ Complete the square

$x^2+(b/a)\ x+(b/2a)^2= -(c/a) + (b/2a)^2$ square 2a

$(x+(b/2a))^2= -(c/a) + (b^2/4a^2)$ make common denominator

$(x+(b/2a))^2= (b^2-4ac)/4a^2$ square root both sides

$x+(b/2a) = (+/-)\sqrt{(b\hat{}2 - 4ac)/4a\hat{}2}$ isolate x

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

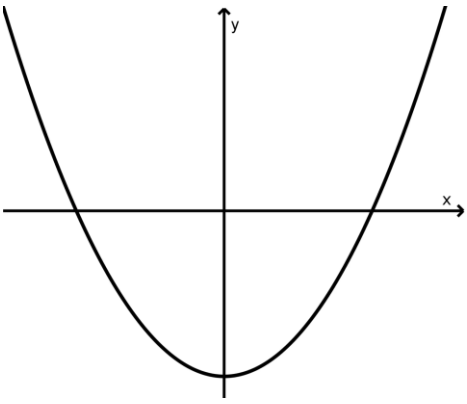
WHEN TEACHING

a: coefficient of x^2

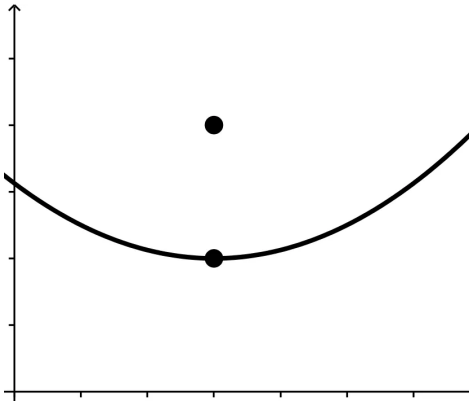
b: coefficient of x

c: constant

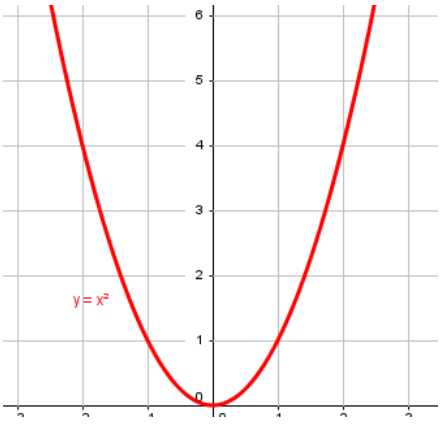
Solutions:



2 real solutions, positive inside square root



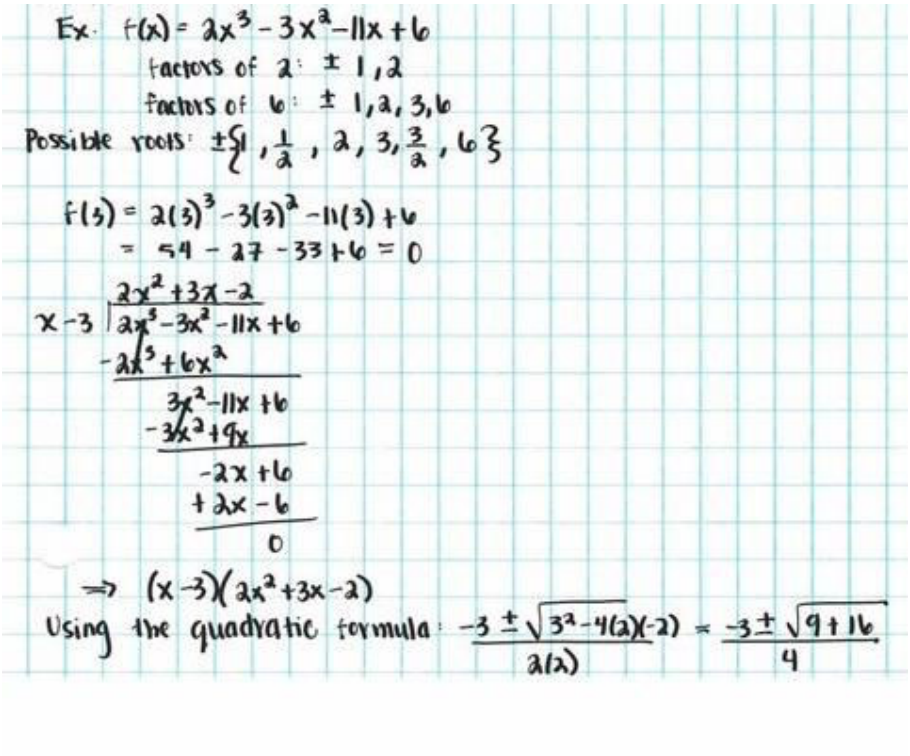
2 imaginary solutions, include i. inside square root negative



1 real repeated solution. Inside square root =0

RATIONAL ROOTS

Can be used to solve for higher degree polynomials here is an example:



Graphics sources:

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