

BE - Alg 2 Tuesday 11-22-11

① Explain WHAT it means if the discriminant ($d = b^2 - 4ac$) is:

Ⓐ 49

Ⓒ 48

Ⓑ 0

Ⓓ -49

RET: Ch. 6-5

• Homework review: Pg. 318 #14, 15, 16, 18

⑭ $d = 21$, 2 irrational roots (solutions), $x = \frac{-3 \pm \sqrt{21}}{2}$

⑮ $d = 240$, 2 irrational roots, $x = 8 \pm 2\sqrt{15}$

⑯ $d = -16$, 2 complex roots, $x = 1 \pm 2i$

⑰ $d = 121$, 2 rational roots, $x = \left\{-\frac{1}{4}, \frac{2}{3}\right\}$

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

QUADRATIC EQUATION

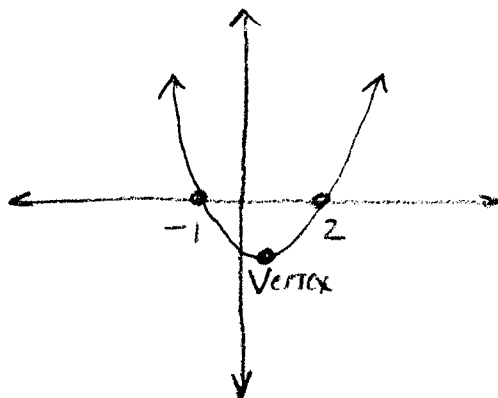
$$ax^2 + bx + c = y$$

QUADRATIC FUNCTION
(IN STANDARD FORM)

A PARABOLA

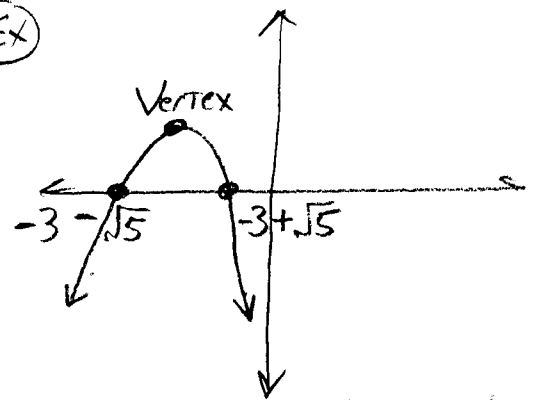
↑
WHEN $y = 0$, the solutions to the QUADRATIC EQUATION ARE the X-intercepts. They may be rational or irrational.

EX



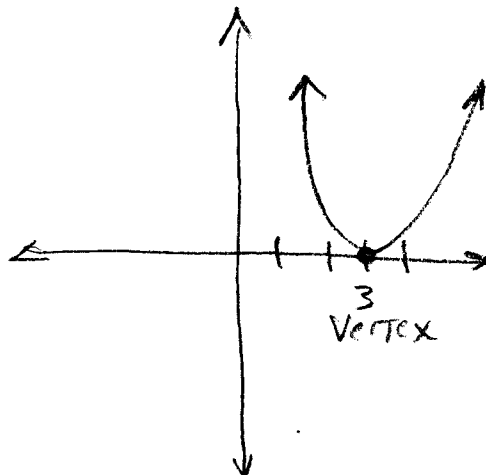
Solution to Quadratic Equation is $X = \{-1, 2\}$

EX



Solution to QUADRATIC Equation is
 $X = \{-3 - \sqrt{5}, -3 + \sqrt{5}\}$

EX

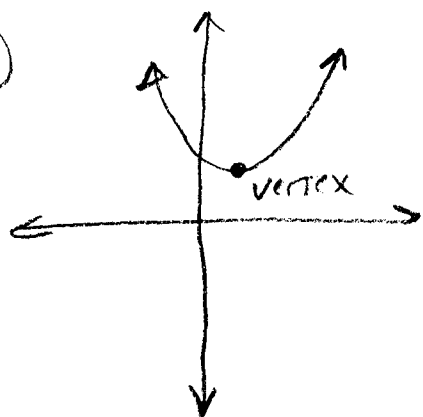


SOLUTION TO THE QUADRATIC EQUATION IS A DOUBLE ROOT
 $X = \{3\}$

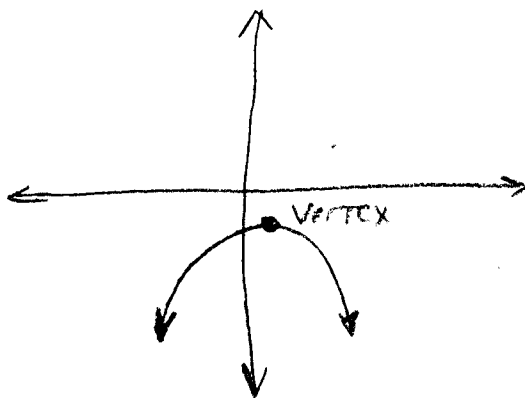
WHAT DOES IT MEAN WHEN THERE ARE NO RATIONAL OR IRRATIONAL SOLUTIONS? (NO RATIONAL OR IRRATIONAL x -INTERCEPTS?)

IT MEANS THE 2 TWO ROOTS ARE COMPLEX AND THE PARABOLA NEVER CROSSES THE x -AXIS.

(EX)



2 complex roots



2 complex roots

Graphing the quadratic function in standard form.

- ① a is positive  "smiley" parabola
 a is negative  "frowny" parabola

- ② Axis of symmetry, which is also the x -coordinate of the vertex (the only point the parabola has on the axis of symmetry is at $x = -\frac{b}{2a}$

memory aid, since this must be true for "double-root" parabolas too, (where $d=0$) $\Rightarrow x = \frac{-b \pm \sqrt{0}}{2a}$

- ③ the y -coordinate of the vertex is found by solving $f(-\frac{b}{2a})$

In other words, substitute into the (the x)

Quadratic Function.

- ④ Find more points as needed $\Rightarrow$ roots, symmetry, y -intercept

Ex GRAPH $X^2 + X - 6 = y$

① Smiley since $a = +1$ ↗

② Axis of Symmetry (and X-coordinate of the vertex) is At $X = \frac{-b}{2a}$

$$X = \frac{-1}{2(1)} = -\frac{1}{2}$$

③ y-coordinate $\Rightarrow f(-\frac{1}{2})$

$$f(x) = x^2 + x - 6$$

$$f(-\frac{1}{2}) = (-\frac{1}{2})^2 + (-\frac{1}{2}) - 6$$

$$= \frac{1}{4} - \frac{1}{2} - 6$$

$$= \frac{1}{4} - \frac{2}{4} - 6 = -6\frac{1}{4}$$

	x	y
V	$-\frac{1}{2}$	$-6\frac{1}{4}$
Y _{int}	0	-6
Sym	-1	-6

Find X-intercepts,

$$X^2 + X - 6 = 0$$

$$\text{Sum} = 1$$

$$\text{prod} = -6$$

$$-2 + 3$$

$$(X+3)(X-2) = 0$$

$$X_{\text{int}} = \{-3, 2\}$$

Solve the Quadratic Equation

