

Wednesday
3-2-11

$$ax^2 + bx + c = 0 \quad \text{Complete The Square} \quad 1.$$

$$\frac{ax^2}{a} + \frac{bx}{a} = \frac{-c}{a}$$

$$x^2 + \frac{b}{a}x = -\frac{c}{a}$$

$$\left(\frac{b}{2a}\right)^2 = \frac{b^2}{4a^2}$$

$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{c}{a} + \frac{b^2}{4a^2}$$

↓

$$\left(x + \frac{b}{2a}\right)^2 = \frac{-4ac + b^2}{4a^2} = \frac{b^2 - 4ac}{4a^2}$$

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

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

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

QUADRATIC FORMULA

A "pre-solved" completing the square for ANY quadratic.

LOOK AT the discriminant

$\Rightarrow d = b^2 - 4ac$, it is under
the $\sqrt{\quad}$

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

$\pm \sqrt{\text{POSITIVE}} \Rightarrow 2 \text{ SOLUTIONS}$

Perfect Sq
↓
RATIONAL

$\pm \sqrt{0} = 0 \Rightarrow 1 \text{ solution} \Rightarrow \frac{-b}{2a}$

$\pm \sqrt{\text{NEGATIVE}} \Rightarrow 0 \text{ real solutions, cannot have a real square root of a negative number}$

SEE TABLE ON PAGE 549

$$X = \frac{-b \pm \sqrt{d}}{2a}$$

$X = \frac{-b}{2a} \Rightarrow \text{EQUATION for AXIS OF SYMMETRY}$

9.

Ch. 10.4 Solving Quadratic Equations Using THE QUADRATIC FORMULA

EX 1
pg 546

$$x^2 - 2x - 24 = 0$$

$$a = 1$$

$$b^2 - 4ac$$

$$b = -2$$

$$(-2)^2 - 4(1)(-24)$$

$$c = -24$$

$$4 + 96 = \boxed{100 = d}$$

$$x = \frac{-b \pm \sqrt{d}}{2a}$$

$$x = \frac{-(-2) \pm \sqrt{100}}{2(1)}$$

$$x = \frac{2 \pm 10}{2}$$

$$x = \frac{2+10}{2}$$

$$x = \frac{2-10}{2}$$

$$x = 6$$

$$x = -4$$

$$x = \{-4, 6\}$$

EX 2
Pg 547

$$24x^2 - 14x = 6$$

$$24x^2 - 14x - 6 = 0$$

$$2(12x^2 - 7x - 3) = 0$$

$$a = 12 \quad b^2 - 4ac$$

$$b = -7 \quad (-7)^2 - 4(12)(-3)$$

$$c = -3 \quad 49 + 144 = 193 = d$$

$$x = \frac{-b \pm \sqrt{d}}{2a} = \frac{7 \pm \sqrt{193}}{24}$$

$x = \frac{7 \pm \sqrt{193}}{24}$ EXACT

$$x = \frac{7 + \sqrt{193}}{24} \quad \left\{ \quad x = \frac{7 - \sqrt{193}}{24} \right.$$

$$x = \frac{7 + 13.89}{24} \quad \left\{ \quad x = \frac{7 - 13.89}{24} \right.$$

$$x = 0.87 \quad \left\{ \quad x = -0.28 \right.$$

$x = \{-0.3, 0.9\}$ APPROXIMATE

STEPS FOR SOLVING ANY QUADRATIC EQUATION IN ONE VARIABLE (2nd degree)

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

- ① PUT IN STANDARD FORM
 $ax^2 + bx + c = 0$
 - ② GCF, if ANY
 - ③ SPECIAL PATTERN, if ANY:
 $a^2 \pm 2ab + b^2 = (a \pm b)^2 \Rightarrow \text{PST}$
 $a^2 - b^2 = (a+b)(a-b) \Rightarrow \text{DOS}$
 - ④ Magic Number Method \Rightarrow if easy
GCF $(ax^2 + bx = 0)$ is \rightarrow TO FACTOR
 - ⑤ Complete the Square or QUADRATIC FORMULA
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Homework: Pg. 550 # 14-20

WATCH OUT, if discriminant
is negative \Rightarrow No Real Roots.