

Section 8.2 11/12/2012
NOTES

THE QUADRATIC FORMULA

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

$$\text{Ex} = \frac{ax^2}{a} + \frac{bx}{a} + \frac{c}{a} = \frac{0}{a}$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

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

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

$$\left(\frac{1}{2} \cdot \frac{b}{a}\right)^2 = \left(\frac{b}{2a}\right)^2 = \frac{b^2}{4a^2}$$

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

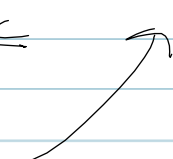
l.c.d. $4a^2$

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

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

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

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

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


TRADITIONAL QUADRATIC FORMULA

(U.S.)
method

ex $9x^2 - 12x - 2 = 0$

$a = 9 \quad b = -12 \quad c = -2$

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

$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(9)(-2)}}{2(9)}$

$x = \frac{12 \pm \sqrt{144 + 72}}{18}$

$x = \frac{12 \pm \sqrt{216}}{18}$

$x = \frac{12 \pm 6\sqrt{6}}{18} = \frac{2 \pm \sqrt{6}}{3}$

2/216
2/108
2/54
3/27
3/9
3

THE BRAZILIAN METHOD

$D = b^2 - 4ac$
D = discriminant

$x = \frac{-b \pm \sqrt{D}}{2a} = \text{FORMULA}$

- ① FIND D
- ② FIND \sqrt{D}
- ③ Put together & simplify

ex $9x^2 - 12x - 2 = 0$
 $a = 9 \quad b = -12 \quad c = -2$

① $D = b^2 - 4ac$
 $= (-12)^2 - 4(9)(-2)$
 $144 + 72$
 $\leftarrow 216$

② $\sqrt{216} = \sqrt{D} = 6\sqrt{6}$

③ $x = \frac{-b \pm \sqrt{D}}{2a}$

— over —

2/216
2/108
2/54
3/27
3/9
3

SECTION 8.2 CONT.
NOV. 12, 2012 NOTES

(Step 3)
$$x = \frac{-b \pm \sqrt{D}}{2a}$$

$$x = \frac{-(-12) \pm \sqrt{6}}{2}$$

$$x = \frac{12 \pm 6\sqrt{6}}{18} = \frac{2 \pm \sqrt{6}}{3}$$

EX
$$\frac{1}{6}x^2 + x + \frac{1}{3} = 0 \quad \text{lcd} = 6$$

$$x^2 + 6x + 2 = 0$$

$a=1 \quad b=6 \quad c=2$

BRAZILIAN

TRADITIONAL

① $D = b^2 - 4ac$
 $D = (6)^2 - 4(1)(2)$
 $D = 36 - 8$
 $D = 28$

$a=1 \quad b=6 \quad c=2$

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

2(28) ② $\sqrt{D} = \sqrt{28} = 2\sqrt{7}$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(2)}}{2(1)}$$

2(4) ③ $x = \frac{-b \pm \sqrt{D}}{2a}$

$$x = \frac{6 \pm \sqrt{36-8}}{2}$$

$$x = \frac{-6 \pm 2\sqrt{7}}{2}$$

$$x = \frac{-6 \pm \sqrt{28}}{2}$$

$$x = \frac{-3 \pm \sqrt{7}}{1}$$

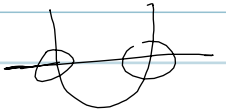
$$x = \frac{-3 \pm 2\sqrt{7}}{1}$$

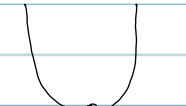
$$x = -3 \pm \sqrt{7}$$

$$x = -3 \pm \sqrt{7}$$

11/12/2012 NOTES CONT.

* DISCRIMINANT

$D > 0 (+)$ $\frac{\# \pm \#}{\#}$ 2 real solns 

$D = 0$ $\frac{\# \pm \sqrt{0}}{\#}$ 1 real soln 

$D < 0 (-)$ $\frac{\# \pm \sqrt{-\#}}{\#}$ 2 imaginary solns
(parabola doesn't cross) 