Class #18 - Tues, Oct. 12

- Check BlackBoard for your graded Quizzes + Exam #1

review the solutions

(review WW/textbook examples)

discuss today + Thurs

- quadratic formula → WW
- graphs of quadratic polynomials
  $y = ax^2 + bx + c$

WebWork schedule

"Square Root Property"

- Class Recording / Class Notes (last Thurs + Fri : #16 and #17)

due Friday

"Quadratic Formula"

(1) What is the quadratic formula? (§9.3 of OpenStax)
Formula gives us the solutions of any given quadratic equation $ax^2 + bx + c = 0$:

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

(2) Where did it come from?

finding the solutions of $ax^2 + bx + c = 0$ (end §9.3) via "completing the square" (see Class #16)

QF

WW : "Quad Fmla" #1

graph

quadratic polynomial.

"List the roots of the parabola $y = 8x^2 + 15x + 6$"

i.e., list the solutions of the quadratic equation $8x^2 + 15x + 6 = 0$

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

x-values where the given quadratic polynomial equals 0

x-intercepts of the graph! (x-values where the parabola crosses the x-axis)

(1) Identify a, b, c :

$$a = 8, \quad b = 15, \quad c = 6$$

$$b^2 - 4ac$$
$$= 15^2 - 4(8)(6)$$
$$= 225 - 192$$
$$= \underline{33}$$

(2) Plug in these values of a, b, c into the QF :

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-15 \pm \sqrt{225 - 4(8)(6)}}{2(8)}$$

$$= \frac{-15 \pm \sqrt{33}}{16} = \ldots$$ can't be simplified.

Another version of QF #1:

Solve: $0 = -7x^2 - 15x + 1$

$a = -7 \quad b = -15 \quad c = 1$

Solutions (by QF):

$$x = \frac{-(-15) \pm \sqrt{(-15)^2 - 4(-7)(1)}}{2(-7)}$$

$$= \frac{15 \pm \sqrt{225 + 28}}{-14}$$

$$= \frac{15 \pm \sqrt{253}}{-14} = -\frac{15}{14} \pm \left(-\frac{\sqrt{253}}{14}\right)$$

$$= -\frac{15}{14} \pm \frac{\sqrt{253}}{14}$$

WW, QF, #2

Solve the quad eqn $x^2 - 14x + 98 = 0$

$$x = \frac{14 \pm \sqrt{196 - 4(1)(98)}}{2(1)}$$

$$= \frac{14 \pm \sqrt{196 - 392}}{2}$$

(where $i = \sqrt{-1}$)

complex #s! Next time...

$$= \frac{14 \pm \sqrt{-196}}{2} = \frac{14 \pm i\sqrt{196}}{2}$$

$$= \frac{14 \pm i(14)}{2} = \boxed{7 \pm 7i}$$