Algebra II
4.8 Quadratic Formula

Obj: To solve a quadratic equation by using the quadratic formula.

Review: Simplify each square root.

$\sqrt{625}$ $\quad$ $8\sqrt{45}$ $\quad$ $2\sqrt{144}$

Reduce if possible:

$\frac{2 \pm \sqrt{7}}{2}$ ← can't reduce

$\frac{8 \pm 2\sqrt{7}}{2}$ ← reduce by 2 b/c both terms can be reduced by 2

$4 \pm \sqrt{7}$

$\frac{2 \pm \sqrt{28}}{2} = \frac{2 \pm 2\sqrt{7}}{2}$ ← simplify radical

$\pm\sqrt{7}$

Quadratic Formula

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

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

a = coefficient of x^2

b = coefficient of x

c = constant

★ A negative number squared becomes a positive number

Solve each using the quadratic formula. (no decimals)

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

A B C

$x^2 - 6x - 7 = 0$

$a = 1$

$b = -6$

$c = -7$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(-7)}}{2(1)}$$

$$= \frac{6 \pm \sqrt{64}}{2} = \frac{6 \pm 8}{2} \quad \frac{6+8}{2} \quad \frac{6-8}{2}$$

$x = 7 ; -1$

Solve each using the quadratic formula. (no decimals)

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

Put the equation in standard form → $2x^2 + x = 5$

$2x^2 + x - 5 = 0$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(2)(-5)}}{2(2)}$$

$$x = \frac{-1 \pm \sqrt{41}}{4}$$

Solve each using the quadratic formula. (no decimals)

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

$12x - 5 = 2x^2 + 13$

$+5 \quad -12x$

$0 = 2x^2 - 12x + 18$

$$x = \frac{12 \pm \sqrt{(-12)^2 - 4(18)(2)}}{2(2)}$$

$$x = \frac{12 \pm \sqrt{144 - 144}}{4}$$

$$x = \frac{12}{4} = 3$$

Solve each using the quadratic formula. (no decimals)

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

$-2x^2 = -2x + 3$

$-2x^2 + 2x - 3 = 0$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(-2)(-3)}}{4}$$

$$x = \frac{-2 \pm \sqrt{-20}}{4}$$

$\emptyset$

Solve each using the quadratic formula.

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

$9x^2 + 6x - 4 = 0$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(9)(-4)}}{18}$$

$$x = \frac{-6 \pm \sqrt{36 - {}^-144}}{18} = \frac{-6 \pm \sqrt{180}}{18} = \frac{-6 \pm \sqrt{36 \cdot 5}}{18}$$

$$= \frac{-6 \pm 6\sqrt{5}}{18} = \frac{-1 \pm \sqrt{5}}{3}$$

Decimal Answer?

Day 2

Solve each using the quadratic formula. Put the equation in standard form first. $ax^2+bx+c=0$

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

$2x^2 - 9 = 0$

$$x = \frac{0 \pm \sqrt{0 - 4(2)(-9)}}{4}$$

$$= \frac{\pm\sqrt{72}}{4} = \frac{\pm 6\sqrt{2}}{4} = \frac{\pm 3\sqrt{2}}{2}$$

can reduce by 2

Day 2

Solve each using the quadratic formula. Put the equation in standard form first. $ax^2+bx+c=0$

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

$$4 \cdot \frac{x^2+14}{4} = -2x \cdot 4$$

$$x^2 + 14 = -8x$$

$$x^2 + 8x + 14 = 0$$

$$x = \frac{-8 \pm \sqrt{8^2 - 4(1)(14)}}{2}$$

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

$$= \frac{-8 \pm 2\sqrt{2}}{2} = -4 \pm \sqrt{2}$$

Day 2

Solve each using the quadratic formula. Put the equation in standard form first. $ax^2+bx+c=0$

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

$$(2x+1)(x-7) = 2$$

$$2x^2 - 14x + x - 7 = 2$$

$$2x^2 - 13x - 9 = 0$$

$$x = \frac{13 \pm \sqrt{13^2 - 4(2)(-9)}}{4}$$

$$(169 - -72)$$

$$x = \frac{13 \pm \sqrt{241}}{4}$$

Day 2

Solve each using the quadratic formula. Put the equation in standard form first. $ax^2+bx+c=0$

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

$$(x-3)^2 = 4x+2$$

$(x-3)(x-3)$

$x^2-3x-3x+9$

x^2-6x+9

$x^2-6x+9=4x+2$

$x^2-10x+7=0$

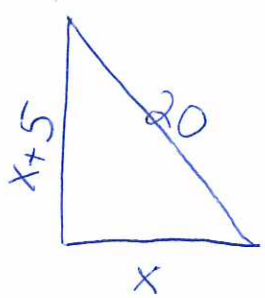
$x = \frac{10 \pm \sqrt{10^2-4(1)(7)}}{2} = \frac{10 \pm \sqrt{72}}{2}$

$x = \frac{10 \pm 6\sqrt{2}}{2} = 5 \pm 3\sqrt{2}$

Day 2

One leg of a right triangle is 5 feet longer than the other leg. The hypotenuse is 20 feet. Find the lengths of the legs.

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



$a^2+b^2=c^2$

$x^2+(x+5)^2=20^2$

$x^2+x^2+10x+25=400$

$2x^2+10x-375=0$

$x = \frac{-10 \pm \sqrt{100-4\cdot 2(-375)}}{4} = \frac{-10 \pm \sqrt{3100}}{4}$

$x \approx 11.419$

Day 2

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

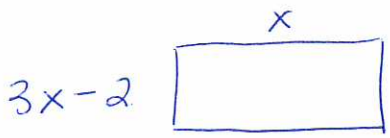
One side of a rectangle is 2 less than 3 times the other. If the area is 50 square inches, find the dimensions.

☆ See below

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(-50)}}{6} \quad (4 - -600)$$

$$= \frac{2 \pm \sqrt{604}}{6}$$

$$x \approx 4.43$$



$A = lw$

$50 = x(3x - 2)$

$50 = 3x^2 - 2x$

$0 = 3x^2 - 2x - 50$