AA PREP—SOLVING QUADRATIC EQUATIONS LECTURE

Methods for Solving Quadratic Equations:

1) Taking Square Root
2) Factoring
3) Quadratic Formula
4) Complete the Square

QUADRATIC FORMULA: $ax^2+bx+c=0$

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

Solve each quadratic equation using the specified method. Simplify radicals!

EX 1: Solve by taking the square root.

a) $\sqrt{x^2}=\sqrt{50}$

$x=\pm\sqrt{50}$

$25\cdot 2$

$5\cdot 5\cdot 2$

$x=\pm 5\sqrt{2}$

b) $\frac{2}{3}(x-1)^2+5=17$

$-5\quad -5$

$\frac{3}{2}\cdot\frac{2}{3}(x-1)^2=\frac{12}{1}\cdot\frac{3}{2}$

$\sqrt{(x-1)^2}=\sqrt{18}$

$x-1=\pm\sqrt{18}$

$9\cdot 2$

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

$+1\quad +1$

$x=1\pm 3\sqrt{2}$

EX 2: Solve by factoring.

a) $4x^2-25=0$ DIFF OF 2 SQUARES

$(2x)^2\quad (5)^2$

$(2x-5)(2x+5)=0$

$2x-5=0$ $\quad 2x+5=0$

$+5\quad +5$ $\quad -5\quad -5$

$\frac{2x}{2}=\frac{5}{2}$ $\quad \frac{2x}{2}=\frac{-5}{2}$

$x=\frac{5}{2}$ $\quad x=-\frac{5}{2}$

b) $-x^2-x+72=0$ GCF IST! BASIC QUADRATIC TRINOMIAL $a=1$

$-(x^2+x-72)=0$

$a\cdot c=-72$, $-8\cdot 9$, $1\cdot b$

$-(x-8)(x+9)=0$

$-1\neq 0$

$x-8=0$ $\quad x+9=0$

$+8\quad +8$ $\quad -9\quad -9$

$x=8$ $\quad x=-9$

EX 3: Solve using quadratic formula.

a) $x^2-2x-8=0$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $\quad x=\frac{2\pm\sqrt{(-2)^2-4(1)(-8)}}{2(1)}$

$a=1$, $b=-2$, $c=-8$

$x=\frac{2\pm\sqrt{4+32}}{2}$

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

$\frac{2+6}{2}=\frac{8}{2}=4$

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

$x=4$, $x=-2$

b) $x^2+6x-4=0$

$a=1$, $b=6$, $c=-4$

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

$x=\frac{-6\pm\sqrt{36+16}}{2}$

$\sqrt{52}=2\sqrt{13}$

$x=\frac{-6\pm 2\sqrt{13}}{2}$

$x=-3\pm\sqrt{13}$

EX 4: Solve by completing the square.

a) $x^2-8x-12=0$

$+12\quad +12$

$x^2-8x=12$

$\frac{-8}{2}=(-4)^2=16$

$x^2-8x+16=12+16$

$\sqrt{(x-4)^2}=\sqrt{28}$

$x-4=\pm 2\sqrt{7}$

$+4\quad +4$

$x=4\pm 2\sqrt{7}$

b) $4x^2+24x-9=0$

$+9\quad +9$

$4x^2+24x=9$

$4(x^2+6x)=9$

$\frac{6}{2}=(3)^2=9$

$4(x^2+6x+9)=9+36$

$4(x+3)^2=\frac{45}{4}$

$\sqrt{(x+3)^2}=\sqrt{\frac{45}{4}}=\frac{\sqrt{45}}{\sqrt{4}}=\frac{3\sqrt{5}}{2}$

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

$-3\quad -3$

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