Warmup:

$2x - 10 = 122$

$x = 66$

$8x - 9 = 583$

$x = 74$

1) $2(a+3)^2 - 10 = 122$

$+10 \quad +10$

$\frac{2(a+3)^2}{2} = \frac{132}{2}$

$\sqrt{(a+3)^2} = \sqrt{66}$

$a + 3 = \pm\sqrt{66}$

$-3 \quad -3$

$a = -3 \pm \sqrt{66}$

$-3 + \sqrt{66}$

$-3 - \sqrt{66}$

2) $8x^2 - 9 = 583$

$+9 \quad +9$

$\frac{8x^2}{8} = \frac{592}{8}$

$\sqrt{x^2} = \sqrt{74}$

$x = \pm\sqrt{74}$

$4n+10=14$

3) $4n^2 + 10 = 14$

$-10 \quad -10$

$\frac{4n^2}{4} = \frac{4}{4}$

$\sqrt{n^2} = \sqrt{1}$

$n = \pm 1$

$3n+4=247$

4) $3(n-10)^2 + 4 = 247$

$-4 \quad -4$

$\frac{3(n-10)^2}{3} = \frac{243}{3}$

$\sqrt{(n-10)^2} = \sqrt{81}$

$n-10 = \pm 9$

$+10 \quad +10$

$n = 10 \pm 9$

$n = 19$	$n = 1$

5) $(x-11)^2+9=90$

$-9 \quad -9$

$\sqrt{(x-11)^2} = \sqrt{81}$

$x-11 = \pm 9$

$x = 11 \pm 9$

$x = 20 \quad | \quad x = 2$

6) $3(x+5)^2-2=22$

$+2 \quad +2$

$\frac{3(x+5)^2}{3} = \frac{24}{3}$

$\sqrt{(x+5)^2} = \sqrt{8}$

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

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

Homework #7

Solving Quadratics by Square Roots

Solve each equation by taking square roots.

1) $m^2 = 81$

$m = \pm\sqrt{81}$

$m = -9$ or 9

2) $p^2 = 82$

$p = \pm\sqrt{82}$

3) $b^2 + 4 = 76$

$b^2 = 72$

$b = \pm\sqrt{72} = \pm\sqrt{36 \cdot 2} = \pm 6\sqrt{2}$

$b = -6\sqrt{2}$ or $6\sqrt{2}$

4) $x^2 + 3 = 27$

$x^2 = 24$

$x = \pm\sqrt{24} = \pm\sqrt{4 \cdot 6} = \pm 2\sqrt{6}$

$x = -2\sqrt{6}$ or $2\sqrt{6}$

5) $m^2 + 8 = 33$

$m^2 = 25$

$m = \pm\sqrt{25} = \pm 5$

$m = -5$ or 5

6) $-9x^2 = 504$

$x^2 = 56$

$x = \pm\sqrt{56}$

$x = \pm 2\sqrt{14}$

7) $8v^2 + 4 = 444$

$8v^2 = 440$

$v^2 = 55$

$v = \pm\sqrt{55}$

$v = -\sqrt{55}$ or $\sqrt{55}$

8) $5m^2 + 5 = 90$

$5m^2 = 85$

$m^2 = 17$

$m = \pm\sqrt{17}$

$m = -\sqrt{17}$ or $\sqrt{17}$

9) $8x^2 + 7 = 263$

$8x^2 = 256$

$x^2 = 32$

$x = \pm\sqrt{32} = \pm\sqrt{16 \cdot 2} = \pm 4\sqrt{2}$

$x = -4\sqrt{2}$ or $4\sqrt{2}$

10) $-10k^2 - 5 = -165$

$-10k^2 = -160$

$k^2 = 16$

$k = \pm\sqrt{16} = \pm 4$

11) $(x+3)^2 - 4 = 23$

$(x+3)^2 = 27$

$x+3 = \pm\sqrt{27}$

$x = \pm\sqrt{27} - 3$

$x = \pm\sqrt{9\cdot 3} - 3 = \pm 3\sqrt{3} - 3$

$x = -3\sqrt{3} - 3$ or $x = 3\sqrt{3} - 3$

$-3 \pm 3\sqrt{3}$

12) $2(x-6)^2 = 50$

$\sqrt{(x-6)^2} = \sqrt{25}$

$x-6 = \pm\sqrt{25}$

$x-6 = \pm 5$

$x-6 = -5$ or $x-6 = 5$

$x = 1$ or $x = 11$

13) $-\frac{1}{2}(x+2)^2 + 8 = 12$

$-\frac{1}{2}(x+2)^2 = -20$

$(x+2)^2 = 40$

$x+2 = \pm\sqrt{40}$

$x+2 = \pm 2\sqrt{10}$

$x = -2 \pm 2\sqrt{10}$

14) $(x-5)^2 - 15 = 30$

$(x-5)^2 = 45$

$x-5 = \pm\sqrt{45}$

$x = 5 \pm \sqrt{45} = 5 \pm \sqrt{9\cdot 5}$

$x = 5 \pm 3\sqrt{5}$

$x = 5-3\sqrt{5}$ or $x = 5+3\sqrt{5}$

15) ~~$3(x+6)^2 - 7 = -21$~~

16) ~~$\frac{1}{4}(x+6)^2 + 4 = 10$~~

15) $-3(x+6)^2 - 7 = -21$

Sorry!!

16) $\frac{1}{4}(x+6)^2 + 4 = 10$

$\frac{1}{4}(x+6)^2 = 6$

$(x+6)^2 = 24$

$x+6 = \pm\sqrt{24}$

$x = \pm\sqrt{24} - 6$

$x = \pm\sqrt{4\cdot6} - 6$

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

$x = -2\sqrt{6} - 6$ or $x = 2\sqrt{6} + 6$

17) $-(x-10)^2 - 4 = -12$

$-(x-10)^2 = -8$

$(x-10)^2 = 8$

$(x-10) = \pm\sqrt{8}$

$x-10 = \pm 2\sqrt{2}$

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

18) $2(x-7)^2 + 9 = 107$

$2(x-7)^2 = 98$

$(x-7)^2 = 49$

$x-7 = \pm 7$

$x = 7 \pm 7$

$x = 7+7 = 14$ or $x = 7-7 = 0$

$-3(x+6)^2 = -15$

$(x+6)^2 = 5$

$x+6 = \pm\sqrt{5}$

$x = -6 \pm \sqrt{5}$

19) $(x+6)^2 - 4 = 40$

$(x+6)^2 = 44$

$x+6 = \pm\sqrt{44}$

$x = \pm\sqrt{44} - 6$

$x = \pm\sqrt{4 \cdot 11} - 6$

$x = \pm 2\sqrt{11} - 6$

$-6 \pm 2\sqrt{11}$

$x = -2\sqrt{11} - 6$

$x = 2\sqrt{11} - 6$

20) $-7(x-8)^2 = -112$

$(x-8)^2 = 16$

$x-8 = \pm\sqrt{16}$

$x-8 = \pm 4$

$x = 8 \pm 4$

$x = 12$ or 4

Solving by Square Roots with Imaginary Solutions

$$\frac{-8a^2}{-8} = \frac{216}{-8}$$

$$\sqrt{a^2} = \sqrt{-27}$$

$$\sqrt{27} = 3\sqrt{3}$$

$$a = \pm\sqrt{-27}$$

$$a = \pm i\sqrt{27}$$

$$a = \pm 3i\sqrt{3}$$

$$\frac{3b^2}{3} = \frac{-180}{3}$$

$$\sqrt{b^2} = \sqrt{-60}$$

$$b = \pm\sqrt{-60} = \pm 2i\sqrt{15}$$

$$8n^2 + 8 = -120$$

$-8 \quad -8$

$$\frac{8n^2}{8} = \frac{-128}{8}$$

$$\sqrt{n^2} = \sqrt{-16}$$

$$n = \pm 4i$$

$$-(x-4)^2 - 12 = 0$$

$+12 \qquad +12$

$$\frac{-(x-4)^2}{-1} = \frac{12}{-1}$$

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

$$x - 4 = \pm 2i\sqrt{3}$$

$+4 \qquad +4$

$$x = 4 \pm 2i\sqrt{3}$$

$$\frac{1}{3}(x+2)^2 + 4 = -22$$

$-4 \qquad -4$

$\frac{1}{3}(x+2)^2 = -26$

$\frac{1}{3} \qquad \frac{1}{3}$

$\sqrt{(x+2)^2} = \sqrt{-78}$

$x+2 = \pm i\sqrt{78}$

$x = -2 \pm i\sqrt{78}$

$$-3(x+5)^2-2=22$$

$$(6x+2)^2+4=-28$$

$-4 \quad -4$

$\sqrt{(6x+2)^2} = \sqrt{-32}$

$6x+2 = \pm 4i\sqrt{2}$

$-2 \quad -2$

$\frac{6x}{6} = \frac{-2 \pm 4i\sqrt{2}}{6}$

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

$-\frac{2}{6} = -\frac{1}{3}$

$\frac{4}{6} = \frac{2}{3}$

HW #8
Solving by Square Roots

Imaginary Solutions