Name: _____ **Algebra II**
Date: **Homework 27**

Problem 1. Fill in the missing information in each equation.
For example, given $(x \quad)^2 = x^2 - 4x + (\quad)^2$, you'll need to complete it with the -2 on the left hand side, and with a 2 on the right giving you $(x-2)^2 = x^2 - 4x + (2)^2$. (Notice that it's not necessary to write $(-2)^2$ since it's gonna be positive anyway. I mean, $(-2)^2 = (2)^2 = 4$, so why waste your time writing an unnecessary symbol?)

(a) $(x+1)^2 = x^2 + 2x + (1)^2$

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

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

(d) $(x-\frac{11}{2})^2 = x^2 - 11x + (\frac{11}{2})^2$

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

(f) $(x-\frac{1}{5})^2 = x^2 - \frac{2}{5}x + (\frac{1}{5})^2$

(g) $(x+\frac{7}{6})^2 = x^2 + \frac{7}{3}x + (\frac{7}{6})^2$

(h) $(x+\frac{b}{2a})^2 = x^2 + \frac{b}{a}x + (\frac{b}{2a})^2$

Problem 2. Solve for x. Write your answers in a solution set. Check your answers. You'll notice that keeping your answers in the form $\frac{a}{b} \pm \frac{c}{b}$ will make it easier to check than if you'd written it like $\frac{a \pm c}{b}$. That is, since you're going to plug your answers back in to the original equations, then writing your answers with a common denominator will just make things more difficult.

(a) $(x-2)^2 - 9 = 0 \implies x \in \{2+3, 2-3\} = \{5, -1\}$

(b) $(x+3)^2 - 3 = 0 \implies x \in \{-3+\sqrt{3}, -3-\sqrt{3}\}$

(c) $(x-3)^2 + 3 = 0 \implies x \in \{3+i\sqrt{3}, 3-i\sqrt{3}\}$

(d) $2(x+1)^2 - 8 = 0 \implies x \in \{-1+2, -1-2\} = \{1, -3\}$

(e) $2\left(x-\frac{1}{4}\right)^2 - \frac{3}{8} = 0 \implies x \in \{\frac{1}{4}+\frac{\sqrt{3}}{4}, \frac{1}{4}-\frac{\sqrt{3}}{4}\}$

(f)

$$3\left(x+\frac{2}{7}\right)^2 + \frac{5}{6} = 0$$

$$3\left(x+\frac{2}{7}\right)^2 = -\frac{5}{6}$$

$$3\left(x+\frac{2}{7}\right)^2 = -\frac{5}{2*3}$$

$$\left(x+\frac{2}{7}\right)^2 = -\frac{5}{2*3*3}$$

$$\left(x+\frac{2}{7}\right) = \pm\sqrt{-\frac{5}{2*3*3}}$$

$$\left(x+\frac{2}{7}\right)=\pm i\frac{\sqrt{5}}{\sqrt{2}*\sqrt{3*3}}$$

$$x+\frac{2}{7}=\pm i\frac{\sqrt{5}}{3\sqrt{2}}$$

$$x+\frac{2}{7}=\pm i\frac{\sqrt{5}}{3\sqrt{2}}$$

$$x=-\frac{2}{7}\pm i\frac{\sqrt{5}}{3\sqrt{2}}$$

$$\implies x\in\left\{-\frac{2}{7}+i\frac{\sqrt{5}}{3\sqrt{2}},-\frac{2}{7}-i\frac{\sqrt{5}}{3\sqrt{2}}\right\}$$

(g) $a(x+h)^2-k=0 \quad (0<k,0<a) \implies x\in\left\{-h+\sqrt{\frac{k}{a}},-h-\sqrt{\frac{k}{a}}\right\}$

(h) $a(x-h)^2+k=0 \quad (0<k,0<a) \implies x\in\left\{h+i\sqrt{\frac{k}{a}},h-i\sqrt{\frac{k}{a}}\right\}$