

Printout

Monday, April 04, 2016

8:42 AM

Completing the Square

Part II

Some of our examples from last class looked **just like the vertex form** of a quadratic equation (that we worked so hard on last section).

$$y = a(x-p)^2 + q$$

Remember how we did this?

$$\begin{aligned}x^2 + 14x &= -40 \\x^2 + 14x + 49 &= 0 \\(x+7)^2 - 49 + 40 &= 0 \\(x+7)^2 - 9 &= 0 \\(x+7)^2 &= 9 \\(x+7) &= \pm 3 \\x+7 &= 3 \quad \text{or} \quad x+7 = -3 \\x &= -4 \quad \text{or} \quad x = -10\end{aligned}$$

$\frac{14}{2} = 7$
 $7^2 = 49$

$x = 3 - 7$

$$\begin{aligned}3x^2 - 24x + 28 &= 0 \\3(x^2 - 8x) + 28 &= 0 \\3(x-4)^2 - 16(3) + 28 &= 0 \\3(x-4)^2 &= 20 \\(x-4)^2 &= \frac{20}{3} \\(x-4) &= \pm \sqrt{\frac{20}{3}}\end{aligned}$$

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

$$x-4 = \sqrt{\frac{20}{3}} \quad \text{or} \quad x-4 = -\sqrt{\frac{20}{3}}$$

$$x = 4 \pm \sqrt{\frac{20}{3}}$$

$$= 4 \pm \frac{\sqrt{20}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = 4 \pm \frac{\sqrt{20}\sqrt{3}}{\sqrt{3}\sqrt{3}} = 4 \pm \frac{\sqrt{60}}{3}$$

$$= 4 \pm \frac{\sqrt{4}\sqrt{15}}{3} = 4 \pm \frac{2\sqrt{15}}{3} = \frac{12 \pm 2\sqrt{15}}{3}$$

$$\left(\frac{1}{\sqrt{2}}\right) \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{\sqrt{2}}{\sqrt{2} \cdot 2} = \frac{\sqrt{2}}{2}$$

$$\frac{2}{4} = \frac{1}{2}$$

$$-2x^2 + 4x + 3 = 0$$

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

$$-2(x-1)^2 - 1(-2) + 3 = 0$$

$$-2(x-1)^2 + 5 = 0$$

$$-2(x-1)^2 = -5$$

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

$$x-1 = \pm \sqrt{\frac{5}{2}}$$

$$x-1 = \pm \sqrt{\frac{5}{2}}$$

$$-2x^2 - 3x + 7 = 0$$

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

$$-2\left(x + \frac{3}{4}\right)^2 - \left(\frac{3}{4}\right)^2(-2) + 7 = 0$$

$$-2\left(x + \frac{3}{4}\right)^2 + \frac{65}{8} = 0$$

$$-2\left(x + \frac{3}{4}\right)^2 = -\frac{65}{8}$$

$$\sqrt{\left(x + \frac{3}{4}\right)^2} = \pm \sqrt{\frac{-65}{-16}}$$

$$\frac{-65}{8(-2)}$$

$$x = 1 \pm \sqrt{\frac{5}{2}}$$

$$x = 1 \pm \sqrt{\frac{5}{2}}$$

$$x = 1 \pm \frac{\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = 1 \pm \frac{\sqrt{10}}{\sqrt{2} \cdot \sqrt{2}} = 1 \pm \frac{\sqrt{10}}{2}$$

$$x = 1 \pm \frac{\sqrt{10}}{2}$$

$$x = 1 \pm \frac{\sqrt{10}}{2}$$

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

$$\left(\frac{3}{4}\right)^2(2) + 7$$

$$= \frac{9}{16} \cdot 2 + 7$$

$$= \frac{18}{16} + 7$$

$$= \frac{9}{8} + 7$$

$$= \frac{9 + 56}{8} = \frac{65}{8}$$

$$\sqrt{(x+4)} - \sqrt{\quad} = 16$$

$$= \frac{8}{8} + \frac{56}{8} = \frac{64}{8}$$

$$x + \frac{3}{4} = \pm \sqrt{\frac{65}{16}}$$

$$x = -\frac{3}{4} \pm \frac{\sqrt{65}}{4} = \frac{-3 \pm \sqrt{65}}{4}$$

Quiz on this next class

HW: pg240
#6,7abc,8,9