Algebra 2 4.5 SRP $(\quad)^2 =$

Solve quadratic equations by using the Square Root property

Solve quadratic equations by completing the square

CTS build it

quadratic

square root

EWE

perfect square number

perfect square trinomial

completing the square (method)

GuidedPractice

3. Find the value of c that makes $x^2 - 14x + ?$ a perfect square. Then write the trinomial as a perfect square.

? 49

$(x-7)^2$

Solve by CTS

$x^2 - 14x + 25 = 0$

$-25 \quad -25$

Build a perfect square (if it isn't one already)

$x^2 - 14x + 49 = -25 + 49$

$\sqrt{(x-7)^2} = \sqrt{24}$

24

$4 \wedge 1$

$2 \wedge 2 \quad 2 \wedge 3$

$x - 7 = \pm\sqrt{24}$

$+7 \quad +7$

$x = 7 \pm 2\sqrt{6}$

Example 6 Equation with Imaginary Solutions

Solve $x^2 + 8x + 22 = 0$ by completing the square.

$-22 \quad -22$

$x^2+8x+16 = -22+16$

$\sqrt{(x+4)^2} = \sqrt{-6}$

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

$-4 \quad -4$

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

$\pm i\sqrt{6}$

$\pm\sqrt{6}\, i$

6A. $x^2 + 2x + 2 = 0$

6B. $x^2 - 6x + 25 = 0$

$-7 \cdot \frac{1}{2} = -\frac{7}{2}$ $\quad -\frac{7}{2} \cdot -\frac{7}{2}$

How is this problem different?

$x^2 - 7x = 6 + \frac{49}{4}$ $\quad \frac{49}{4}$

$\left(x - \frac{7}{2}\right)^2 = 18\frac{1}{4}$

$\sqrt{\left(x - \frac{7}{2}\right)^2} = \sqrt{\frac{73}{4}}$

$x - \frac{7}{2} = \pm\frac{\sqrt{73}}{2}$

$x = \frac{7}{2} \pm \frac{\sqrt{73}}{2}$

$x = \frac{7 \pm \sqrt{73}}{2}$

How is this problem different?

20. $x^2 - 5x + 6.25 = 4$ $-6\frac{1}{4}$ $-6\frac{1}{4}$

$\frac{9}{25} \cdot \frac{1}{2}$

$\frac{9}{50} \cdot \frac{9}{50}$

$x = \frac{9}{50} \pm \frac{\sqrt{12581}}{50}$

$\frac{31}{100}$

$x^2 - 0.36x = 5$

$\frac{9}{25}$

$x^2 - \frac{9}{25}x + \frac{81}{2500} = 5 + \frac{81}{2500}$

$\left(x - \frac{9}{50}\right)^2 = 5\frac{81}{2500}$

$\left(x - \frac{9}{50}\right)^2 = \frac{12581}{2500}$

$x - \frac{9}{50} = \pm \frac{\sqrt{12581}}{50}$

$\frac{5}{2}\cdot\frac{5}{2}$ $x^2-5x+\frac{25}{4}=-\frac{9}{4}+\frac{25}{4}$

$\sqrt{\left(x-\frac{5}{2}\right)^2}=\sqrt{4}$

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

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

$x=4.5$ $\frac{9}{2}$

$x=-0.5$ $-\frac{1}{2}$

23. $x^2 - 3x + \frac{9}{4} = 6$

Big picture: fractions preferred
(trust me)

How is this problem different?

Example 5 Equation with $a \neq 1$

Solve $\frac{2x^2}{2} - \frac{7x}{2} + \frac{5}{2} = \frac{0}{2}$ by completing the square.

$$x^2 - \frac{7}{2}x + \frac{5}{2} = 0$$

5A. $3x^2 + 10x - 8 = 0$

$\frac{3}{3} \quad \frac{10}{3} \quad \frac{8}{3} \quad \frac{0}{3}$

$x^2 + \frac{10}{3}x - \frac{8}{3} = 0$

5B. $3x^2 + 14x - 16 = 0$

$\frac{}{3} \quad \frac{}{3} \quad \frac{}{3} \quad \frac{}{3}$

$x^2 + \frac{14}{3}x - \frac{16}{3} = 0$