

Solving Quadratic Equations by Extracting the Roots

Some quadratic equations can be written with a perfect square of a form of the variable on one side of the equal sign. We can use roots extraction to solve the equation (not as bad as it might sound, dentally)

Examples:

$$x^2 = 36$$

we can take the square root of both sides

$$\sqrt{x^2} = \sqrt{36} \quad \text{remember } \sqrt{36} = \pm 6$$

$$x = 6 \quad \text{or } x = -6$$

$$4u^2 - 9 = 0$$

$$4u^2 = 9$$

$$\sqrt{4u^2} = \sqrt{9}$$

$$2u = 3 \quad \text{or } 2u = -3$$

$$u = 3/2 \quad \text{or } u = -3/2$$

$$25x^2 - 8 = 0$$

$$x^2 = \frac{8}{25}$$

$$x = \sqrt{\frac{8}{25}} \quad \text{or } x = -\sqrt{\frac{8}{25}}$$

$$x = \frac{2\sqrt{2}}{5} \quad \text{or } x = -\frac{2\sqrt{2}}{5}$$

$$(4y - 5)^2 - 6 = 0$$

$$(4y - 5)^2 = 6$$

$$4y - 5 = \sqrt{6} \quad \text{or } 4y - 5 = -\sqrt{6}$$

$$4y = \sqrt{6} + 5 \quad \text{or } 4y = -\sqrt{6} + 5$$

$$y = \frac{\sqrt{6} + 5}{4} \quad \text{or } y = \frac{-\sqrt{6} + 5}{4}$$