

# TÄYDELLINEN TOISEN ASTEEN YHTÄLÖ

## Neliöleri täydentäminen

Harjoittele!

esim  $x^2 - 6x + 2 = 0$

$$x^2 - 6x = -2$$

$$x^2 - \boxed{2 \cdot 3 \cdot x} + \boxed{3^2} = -2 + 3^2$$

$$(x - 3)^2 = 7 \quad \sqrt{\quad}$$

$$\boxed{x - 3} = \pm \sqrt{7}$$
$$x = \pm \sqrt{7} + 3$$

$$x = 3 - \sqrt{7}$$

$$\text{tai } x = 3 + \sqrt{7}$$

$$(a - b)^2 = a^2 - \boxed{2ab} + \boxed{b^2}$$
$$(a + b)^2$$

esim2

$$x^2 - 10x + 21 = 0$$

$$x^2 - 2 \cdot \overset{b}{5} \overset{a}{x} = -21$$

$$x^2 - \overset{b}{2 \cdot 5} \overset{a}{x} + 5^2 = -21 + 5^2$$

$$(x - 5)^2 = 4 \quad \sqrt{\quad}$$

$$x - 5 = \pm \sqrt{4}$$

$$x - 5 = \pm 2$$

$$x = \pm 2 + 5 = 5 \pm 2$$

$$x = 5 + 2$$

tai

$$x = 5 - 2$$

V:  $x = 7$

tai

$$x = 3$$

TOISEN ASTEEN YHTÄLÖN  
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$$ax^2 + bx + c = 0, \quad a \neq 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, \quad b^2 - 4ac \geq 0$$

esim  $4x^2 + 7x - 2 = 0$

$$x = \frac{-7 \pm \sqrt{7^2 - 4 \cdot 4 \cdot (-2)}}{2 \cdot 4}$$

$$\begin{array}{|l} a = 4 \\ b = 7 \\ c = -2 \end{array}$$

$$= \frac{-7 \pm \sqrt{49 + 32}}{8}$$

$$= \frac{-7 \pm \sqrt{81}}{8}$$

$$= \frac{-7 \pm 9}{8}$$

$$x_1 = \frac{-7+9}{8} \quad \text{j} \quad x_2 = \frac{-7-9}{8}$$

$$\underline{\underline{x_1 = \frac{2}{8} = \frac{1}{4} \quad \text{j} \quad x_2 = -2}}$$

esim  $-3x^2 + 7x - 4 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-b \pm \sqrt{D}}{2a}$$