

$$\frac{2x+a^2-3a}{x-1} = a \quad \text{Mj: } \begin{matrix} x-1 \neq 0 \\ x \neq 1 \end{matrix}$$

$$\frac{2x+a^2-3a-(a(x-1))}{x-1} = 0 \quad | \cdot (x-1) (x \neq 0)$$

$$2x+a^2-3a-ax+a = 0$$

$$a^2-2a-ax+2x = 0$$

$$a^2-2a-x(a-2) = 0$$

$$-x(a-2) = -a^2+2a \quad | : (a-2) \quad \text{Mj: } a-2 \neq 0$$

$$-x = \frac{-a^2+2a}{a-2} \quad \cancel{(-)}$$

$$+x = \frac{+a(a-2)}{(a-2)}$$

$$\uparrow x = +a$$

$$x = a$$

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$$+x = + \frac{+a(a-2)}{(a+2)}$$

$$\uparrow x = +a$$

$$x = a$$

$$x \in \mathbb{R}, \text{ kun } a \neq 2 \text{ ja } a \neq 1 \quad x \neq 1$$

$$\text{Kun } a=2:$$

$$\frac{2x+2^2-3 \cdot 2}{x-1} = 2$$

$$\frac{2x-2-2(x-1)}{x-1} = 0 \quad | \cdot x-1$$

$$2x-2-2x+2 = 0$$

$$0 = 0$$

$$x \in \mathbb{R}, a \neq 1$$

$$-\frac{3}{2}$$

$$\text{ja } x+3 \neq 0$$

$$x \neq -3$$

$$x = \frac{1 \pm \sqrt{13}}{2}$$

Kun $a=1$:

$$\frac{2x+1^2-3 \cdot 1}{x-1} = 1$$
$$\frac{2x-2-x+1}{x-1} = 0 \quad | \cdot (x-1) \neq 0$$
$$x-1 = 0$$

$x=1$ ei ratk.
ei ratk.

$V: \begin{cases} x=a, & \text{kun } a \neq 2, a \neq 1 \\ \text{kun } a=2, x \in \mathbb{R}, & a \neq 1 \\ \text{kun } a=1, x \text{ille ei ole reaalista ratkaisua} \end{cases}$

12. 11. 14.

K9

93/i Ratkaise yhtälö

$$\frac{x}{x-3} = \frac{x-3}{x}$$

$$\text{Mj: } \underline{x-3 \neq 0} \quad \text{ja } x \neq 0 \\ x \neq 3$$

$$\overset{x}{x} - \overset{x-3}{x-3} = 0$$

$$\frac{x^2 - (x-3)^2}{x(x-3)} = 0$$

$$\cancel{x^2} - \cancel{x^2} + 6x - 9 = 0 \quad || \cdot x(x-3)$$

$$6x - 9 = 0$$

$$6x = 9 \quad || :6$$

$$x = \frac{9}{6} = \frac{3}{2} \in \text{mj.}$$

$$V: x = \frac{3}{2}$$

S78/2

$$\frac{4x^2 + 1}{x} \geq 4$$

$$\frac{4x^2 + 1}{x} - 4 \geq 0$$

$$\frac{4x^2 + 1 - 4x}{x} \geq 0$$

$$\frac{4x^2 - 4x + 1}{x} \geq 0$$

ratkaistaan nk.

$$\frac{4x^2 - 4x + 1}{x} = 0$$

$$4x^2 - 4x + 1 = 0$$

$$x = 1$$

m.j. $x \neq 0$

$4x^2 - 4x + 1$	+	+	+
x	-	+	+
osamäärä	-	+	+

$$\underline{V: x > 0}$$