

10.11.2022

Yeni 7

Amis/le 3

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$$m) 2(x - 2,5) = -13$$

$$2x - 5 = -13$$

$$2x = -13 + 5$$

$$2x = -8$$

$$x = -4$$

$$n) \left| 2 - \frac{3}{4}x \right| = 3$$

$$2 - \frac{3}{4}x = 3$$

$$(1) 2 - \frac{3}{4}x = -3$$

$$x_1 = -\frac{4}{3}$$

$$x_2 = \frac{20}{3}$$

(E-N) ...

(S) ...

...

$$g) \log_{0,2}(x-1) = -2 \quad x-1 = \left(\frac{1}{5}\right)^{-2} \quad 5^{x^2-x} = 25$$

$$\log_{0,2}(x-1) = -2 \Rightarrow x-1 > 1$$

$$5^{x^2-x} = 5^2$$

$$x^2 - x = 2$$

$$x^2 - x - 2 = 0$$

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

$$x-1 = 5^2$$

$$x-1 = 25$$

$$x = 25 + 1$$

$$x = 26$$

$$x \cdot (x+1) - 2(x+1) = 0$$

$$x+1 = 0$$

$$x+2 = 0$$

$$x_1 = -1$$

$$x_2 = 2$$

2)

$$w) \frac{2}{x} = x$$

$$p) \tan(x) = -1$$

$$\frac{2}{x} = x \quad x \neq 0$$

$$\tan(x) = -1 \quad x \neq \frac{\sqrt{2}}{2} + k\sqrt{2}, k \in \mathbb{Z}$$

$$2 = x^2$$

$$x = \frac{3\sqrt{2}}{4}$$

$$x^2 = 2$$

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

$$x_1 = -\sqrt{2}$$

$$x_2 = \sqrt{2}$$

$$x = \frac{3\sqrt{2}}{4} + \frac{k\sqrt{2}}{4} + k\sqrt{2} \quad k \in \mathbb{Z}$$



$$g) \sqrt[3]{2^{x-1}} = 4$$

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

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

$$\frac{1}{3}x - \frac{1}{3} = 2$$

$$x - 1 = 6$$

$$x = 6 + 1$$

$$x = 7$$

$$g) |x| = -x$$

$$|x| + x = 0$$

$$x + x = 0$$

$$x \geq 0$$

$$-x + x = 0$$

$$x < 0$$

$$x = 0$$

$$x \in (-\infty, 0)$$

$$x \in (-\infty, 0]$$

~~2)~~

3)

$$u) \frac{7(x-3)}{x-1} = 2$$

$$\frac{7(x-3)}{x-1} = 2 \quad x \neq 1$$

$$\frac{7x-21}{x-1} = 2$$

$$7x-21 = 2(x-1)$$

$$7x-2x = -2+21$$

$$5x = 19$$

$$x = \frac{19}{5} \quad x \neq 1$$

$$r) x^3 = x$$

$$x^3 - x = 0$$

$$x \cdot (x^2 - 1) = 0$$

$$x = 0$$

$$x^2 - 1 = 0$$

$$x_1 = 0$$

$$x_2 = -1$$

$$x_3 = 1$$

$$g) \sqrt[3]{5x-3} = -1$$

$$5x-3 = -1^3$$

$$5x-3 = -1$$

$$5x = -1 + 3$$

$$5x = 2$$

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

$$g) \log_3(3x-29) = 2$$

$$\log_3(3x-29) = 2 \quad x > \frac{29}{3}$$

$$3x-29 = 3^2$$

$$3x-29 = 9$$

$$3x = 9+29$$

$$3x = 38$$

$$x = \frac{38}{3}$$

$$4) \sqrt[3]{3x-1} = -4$$

$$3x-1 = -4^3$$

$$3x-1 = -64$$

$$3x = -64+1$$

$$3x = -63$$

$$x = -21$$

$$g) 4^{2x} - 15 \cdot 4^x - 16 = 0$$

$$(4^x)^2 - 15 \cdot 4^x - 16 = 0$$

$$t^2 - 15t - 16 = 0$$

$$t = -1$$

$$t = 16$$

$$4^x = -1$$

$$4^x = 16$$

$$x = 2$$



$$y) \log_{0,5} (2x-4) = -2$$

$$\log_{0,5} (2x-4) = -2 \quad x > 2$$

$$2x-4 = 0,5^{-2}$$

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

$$2x-4 = 4$$

$$2x = 4 + 4$$

$$2x = 8$$

$$x = 4 \quad x > 2$$

5)

$$f) x^2 - 2 \cdot |x| - 3 = 0$$

$$x^2 - 2x - 3 = 0 \quad x \geq 0$$

$$x^2 - 2 \cdot (-x) - 3 = 0 \quad x < 0$$

$$x_2 = 3$$

$$x_1 = -3$$

$$g) 5^x + 5^{x+1} = 1,2$$

$$(1+5) \cdot 5^x = 1,2$$

$$6 \cdot 5^x = 1,2$$

$$5^x = 0,2$$

$$5^x = 5^{-1}$$

$$x = -1$$

$$g) \log_{10}(x^2) = \log_{10}(x)^2$$

$$\log_{10}(x^2) = \log_{10}(x)^2$$

$$x \in (0, +\infty)$$

$$2 \log_{10}(|x|) = \log_{10}(x)^2$$

$$2 \log_{10}(x) - \log_{10}(x)^2 = 0$$

$$\log_{10}(x) = 0$$

$$2 - \log_{10}(x) = 0$$

$$x_1 = 1$$

$$x_2 = 100$$

6)

$$f) -0,1x^3 + 100 = 0$$

$$-\frac{1}{10}x^3 + 100 = 0$$

$$-\frac{1}{10}x^3 = -100$$

$$x^3 = 1000$$

$$x^3 = 10^3$$

$$x = 10$$

$$g) 2\sqrt{x} + \sqrt{x} = 15$$

$$2\sqrt{x} + \sqrt{x} - 15 = 0$$

$$\sqrt{x} + 2\sqrt{x} - 15 = 0$$

$$3\sqrt{x} - 15 = 0$$

$$\sqrt{x} = 5$$

$$\sqrt{x} = 3$$

$$x = 81$$



$$g) 1 - \log_6(x+1) = 0$$

$$1 - \log_6(x+1) = 0 \quad x > -1$$

$$-\log_6(x+1) = -1$$

$$\log_6(x+1) = 1$$

$$x+1 = 6^1$$

$$x+1 = 6$$

$$x = 6 - 1$$

$$x = 5$$

7

$$a) 5(x+2) = 2(x+5)$$

$$5x + 10 = 2x + 10$$

$$5x = 2x$$

$$5x - 2x = 0$$

$$3x = 0$$

$$x = 0$$

$$p) \frac{2y^2 - 7y + 3}{2y - 1} = 0$$

$$\frac{2y^2 - 7y + 3}{2y - 1} = 0 \quad y \neq \frac{1}{2}$$

$$\frac{2y^2 - y - 6y + 3}{2y - 1} = 0$$

$$\frac{y \cdot (2y - 1) - 3(2y - 1)}{2y - 1} = 0$$

$$\frac{(2y - 1)(y - 3)}{2y - 1} = 0$$

$$y - 3 = 0$$

$$y = 3$$

$$g) \left(\frac{2}{5}\right)^{4x+5} = \left(\frac{5}{2}\right)^{2-7x}$$

$$\left(\frac{2}{5}\right)^{4x+5} = \left(\frac{2}{5}\right)^{-2+7x}$$

$$4x+5 = -2+7x$$

$$4x-7x = -2-5$$

$$-3x = -7$$

$$x = \frac{7}{3}$$

$$g) 2\sin\left(\frac{x}{2}\right)^2 = \cos x$$

$$2 \cdot \frac{1-\cos x}{2} = \cos x$$

$$1-\cos x = \cos x$$

$$-\cos x - \cos x = -1$$

$$-2\cos(x) = -1$$

$$\cos(x) = \frac{1}{2}$$

$$x = \frac{\pi}{3} + 2k\pi \quad k \in \mathbb{Z}$$

$$x = \frac{5\pi}{3} + 2k\pi \quad k \in \mathbb{Z}$$

8)

$$u) \frac{2x^2 - 3x + 1}{\sqrt{x-1}} = 0$$

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

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

$$x \cdot (2x-1) - (2x-1) = 0$$

$$(2x-1)(x-1) = 0$$

$$2x-1 = 0$$

$$x-1 = 0$$

$$x \neq \frac{1}{2} \quad x \neq 1 \quad \text{unp. } \emptyset$$

$$p) 2^{3-x} = \frac{1}{4}$$

$$2^{3-x} = 2^{-2}$$

$$3-x = -2$$

$$-x = -2-3$$

$$5-x = 5$$

$$x = 5$$



$$g) \log_3(x^2 - 2x) = 1$$

$$x^2 - 2x = 3^1$$

$$x^2 - 2x = 3$$

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

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

$$x \cdot (x+1) - 3(x+1) = 0$$

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

$$x_1 = -1$$

$$x_2 = 3$$

$$h) 2\cos(x)^2 = 1$$

$$\cos(x)^2 = \frac{1}{2}$$

$$\cos(x) = \pm \frac{\sqrt{2}}{2}$$

$$\cos(x) = -\frac{\sqrt{2}}{2}$$

$$\cos(x) = \frac{\sqrt{2}}{2}$$

$$x = \frac{\pi}{4} + \frac{k\pi}{2} \quad k \in \mathbb{Z}$$

~~$$g) 2\sin\left(\frac{x}{2}\right)^2 \cos x$$~~  
~~$$2 \cdot \frac{1 - \cos x}{2} \cdot \cos x$$~~  
~~$$1 - \cos x \cdot \cos x$$~~  
~~$$1 - \cos^2 x$$~~  
~~$$= \sin^2 x$$~~

9.1

$$u) 2x \cdot (x-1) = 3(x-1)$$

$$2x^2 - 2x = 3x - 3$$

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

$$2x^2 - 5x + 3 = 0$$

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

$$(x-1) \cdot (2x-3) = 0$$

$$x-1 = 0$$

$$2x-3 = 0$$

$$x_1 = 1$$

$$x_2 = 1,5$$

$$p) \sqrt{3x-8} = 2 - \sqrt{5-x}$$

$$3x-8 = 4 - 2\sqrt{5-x}$$

$$3x = 4 + 8 - 2\sqrt{5-x}$$

$$3x = 12 - 2\sqrt{5-x}$$

$$x = \frac{13}{3} = x$$

$$S = (x \in \mathbb{R}) \cap (x < 5)$$

$$g) \log_5(5-3x) = 2$$

$$1 = 5^{\log_5(5-3x)} = 25 \quad | x < \frac{5}{3}$$

$$5 = 5(5-x)$$

$$5 = 25 - 5x$$

$$5 - 25 = -5x$$

$$5 = 20 - 5x$$

$$1 = 4 - x$$

$$x = 3$$

$$j) 2(\cos(x)-1) = 0 \quad | \cos(x) = 1 \quad | 5 - 3x = 25 = 0$$

$$\cos(x) = 1 = 0$$

$$\frac{20}{5} = \frac{25}{5} - 3x = 20$$

$$\cos(x) = 1$$

$$x = -\frac{20}{3}$$

$$x = 0$$

$$x = 2k\pi \quad k \in \mathbb{Z}$$



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w)  $\sqrt{2x-1} = 3 \rightarrow 2x-1 = 9$  p)  $2^{x^2} = 2^x$

$2x - 1 = 9$

$x^2 = x$

$2x = 9 + 1 = 10$

$x^2 - x = 0$

$2x = 10$

$x(x-1) = 0$

$x = \frac{10}{2} = 5$

$x = 0$  or  $x = 1$

g)  $\log_2((x-3)^2) = 2$

$x-1 = 0$

$x \neq 3$   $\sqrt{(x-3)^2} = 2^2 = 4$

$(x-3)^2 = 2^2 = 4$   $x_2 = 1$

$(x-3)^2 = 4$

$x-3 = \pm 2$

$|\sin(x)| = |\cos(x)|$

$x-3 = -2$

$\sin(x) = \cos(x)$

$x-3 = 2$

$\sin(x) = -\cos(x)$

$x_1 = 1$

$x = \frac{\pi}{4} + \frac{k\pi}{2}$   $k \in \mathbb{Z}$

$x_2 = 5$

11) 3

$$u) \frac{3x-5}{7x+5} = \frac{1}{4}$$

$$x \neq -\frac{5}{7}$$

$$4(3x-5) = 7x+5$$

$$12x - 20 = 7x + 5$$

$$12x - 7x = 5 + 20$$

$$5x = 25$$

$$x = 5$$

$$p) \sqrt{x^2 - 6x} = x - 2$$

$$x^2 - 6x = x^2 - 4x + 4$$

$$-6x = -4x + 4$$

$$-6x + 4x = 4$$

$$-2x = 4$$

$$x = -2$$

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

$$4 = -4$$

$$x \neq -2$$

$$g) 3^x + 3^{x-1} = 4$$

$$(3+1) \cdot 3^{x-1} = 4$$

$$4 \cdot 3^{x-1} = 4$$

$$3^{x-1} = 1$$

$$3^{x-1} = 3^0$$

$$x-1 = 0$$

$$x = 1$$

$$j) \sin\left(2x - \frac{\sqrt{3}}{6}\right) = 0$$

$$2x - \frac{\sqrt{3}}{6} = 0$$

$$2x - \frac{\sqrt{3}}{6} = \pi$$

$$2x - \frac{\sqrt{3}}{6} = 2\pi + 2k\pi \quad k \in \mathbb{Z}$$

$$2x - \frac{\sqrt{3}}{6} = \pi + 2k\pi \quad k \in \mathbb{Z}$$

$$x = \frac{\sqrt{3}}{12} + \frac{k\pi}{2} \quad k \in \mathbb{Z}$$



12)

$$a) \frac{3}{4} : (2,5 - 7x) = 1 \quad x \neq \frac{5}{14}$$

$$\frac{3}{4} : \left(\frac{5}{2} - 7x\right) = 1 \quad | \cdot \frac{x^2}{x-6} = \frac{36}{x-6}$$

$$\frac{3}{4} : \frac{5 - 14x}{2} = 1 \quad | \cdot \frac{x^2}{x-6} = \frac{36}{x-6} \quad x \neq 6$$

$$\frac{3}{4} \cdot \frac{2}{5 - 14x} = 1 \quad | \cdot (5 - 14x) = 36$$

$$x^2 = 36$$

$$x = \pm 6$$

$$\frac{3}{2} \cdot \frac{2}{5 - 14x} = 1$$

$$x = -6 \rightarrow x \neq 6$$

$$x = 6$$

$$\frac{3}{2(5 - 14x)} = 1$$

$$x = -6$$

$$3 = 2(5 - 14x)$$

$$3 = 10 - 28x \quad | -10 \quad | : (-1) \quad 3^{0,5x-6} = 7^{0,5x-6}$$

$$28x = 10 - 3$$

$$\left(\frac{3}{7}\right)^{0,5x-6} = 1$$

$$28x = 7$$

$$\left(\frac{3}{7}\right)^{0,5x-6} = \left(\frac{3}{7}\right)^0$$

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

$$0,5x - 6 = 0$$

$$0,5x = 6$$

$$x = 12$$

$$g) \sin x - \sqrt{3} \cos x = 0$$

$$\sin(x) = \sqrt{3} \cos x$$

$$\tan(x) = \sqrt{3}$$

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

$$x = \frac{\pi}{3} + k\pi, \quad k \in \mathbb{Z}, \quad x \neq \frac{\pi}{2} + k\pi, \quad k \in \mathbb{Z}$$

$$x = \frac{\pi}{3} + k\pi \quad k \in \mathbb{Z}$$