

MATHEMATIK G9C

KLASSENARBEIT 4, 19.04.2018

Aufgabe	1	2	3	4	5	6	7	8	9	10
Punkte (max)	2	3	4	4	4	2	3	3	3	2
Punkte										

Löse folgende Gleichungen.

$$(1) \quad 2(3 - x) - 5(x - 2) = 13x + 6$$

$$(2) \quad x + \frac{1}{x} = \frac{5}{2}$$

$$(3) \quad \frac{5}{x} + \frac{1}{3} = \frac{4}{x - 1}$$

$$(4) \quad \frac{x}{x + 2} + 1 = -\frac{5}{x + 2}$$

$$(5) \quad \frac{1}{x - 3} + \frac{2}{x + 3} = \frac{2x + 1}{x^2 - 9}$$

$$(6) \quad (2x^2 - 1)(x^2 - 20) = 0$$

$$(7) \quad (2x - 1)^2 = 3x^2 + 1$$

$$(8) \quad 2x^3 - 7x^2 + 3x = 0$$

$$(9) \quad x^4 + 2x^2 = 15$$

$$(10) \quad \sqrt{x^2 + 4^2 + 7^2} = 9$$

LÖSUNGEN

1.

$$\begin{aligned}
 2(3-x) - 5(x-2) &= 13x + 6 \\
 6 - 2x - 5x + 10 &= 13x + 6 \\
 16 - 7x &= 13x + 6 & | + 7x - 6 \\
 10 &= 20x & | : 20 \\
 x &= \frac{1}{2}
 \end{aligned}$$

2.

$$\begin{aligned}
 x + \frac{1}{x} &= \frac{5}{2} & | \cdot 2x \\
 2x^2 + 2 &= 5x & | - 5x \\
 2x^2 - 5x + 2 &= 0 \\
 (2x-1)(x-2) &= 0 \\
 x_1 = \frac{1}{2} \quad x_2 &= 2
 \end{aligned}$$

3.

$$\begin{aligned}
 \frac{5}{x} + \frac{1}{3} &= \frac{4}{x-1} & | \cdot 3x(x-1) \\
 15(x-1) + x(x-1) &= 12x \\
 15x - 15 + x^2 - x &= 12x & | - 12x \\
 x^2 + 2x - 15 &= 0 \\
 (x+5)(x-3) &= 0 \\
 x_1 = -5, \quad x_2 &= 3
 \end{aligned}$$

4.

$$\begin{aligned}
 \frac{x}{x+2} + 1 &= -\frac{5}{x+2} & | \cdot (x+2) \\
 x + x + 2 &= 5 & | - 2 \\
 2x &= 3 & | : 2 \\
 x &= \frac{3}{2}
 \end{aligned}$$

5.

$$\begin{aligned} \frac{1}{x-3} + \frac{2}{x+3} &= \frac{2x+1}{x^2-9} & | \cdot (x-3)(x+3) \\ x+3 + 2(x-3) &= 2x+1 \\ x+3 + 2x-6 &= 2x+1 & | -2x+3 \\ x &= 4 \end{aligned}$$

6.

$$\begin{aligned} (2x^2 - 1)(x^2 - 20) &= 0 \\ x_{1,2} &= \pm\sqrt{\frac{1}{2}} \quad x_2 = \pm\sqrt{20} \end{aligned}$$

7.

$$\begin{aligned} (2x-1)^2 &= 3x^2 + 1 \\ 4x^2 - 4x + 1 &= 3x^2 + 1 & | -3x^2 - 1 \\ x^2 - 4x &= 0 & x(x-4) = 0 \quad x_1 = 0 \quad x_2 = 4 \end{aligned}$$

8.

$$\begin{aligned} 2x^3 - 7x^2 + 3x &= 0 \\ x(2x^2 - 7x + 3) &= 0 \\ x(2x-1)(x-3) &= 0 \\ x_1 = 0 \quad x_2 &= \frac{1}{2} \quad x_3 = 3 \end{aligned}$$

9.

$$\begin{aligned} x^4 + 2x^2 &= 15 & | -15 \\ x^4 + 2x^2 - 15 &= 0 \\ (x^2 - 3)(x^2 + 5) &= 0 & x_{1,2} = \pm\sqrt{3} \end{aligned}$$

10.

$$\begin{aligned} \sqrt{x^2 + 4^2 + 7^2} &= 9 & | ^2 \\ x^2 + 65 &= 81 & | -65 \\ x^2 &= 16 & | \sqrt{\quad} \\ x_{1,2} &= \pm 4. \end{aligned}$$