

Aufgabe 6

a) $f(x) = (x - 1)(x - 2)$

b) $f(x) = (x + 9)(x - 9)(x + 7)$

c)

$$\begin{aligned} f(x) &= (x - \sqrt{2}) (x - (1 + \sqrt{2})) (x - (1 - \sqrt{2})) \\ &= (x - \sqrt{2})(x - 1 - \sqrt{2})(x - 1 + \sqrt{2}) \end{aligned}$$

Aufgabe 7

a)

$$\begin{aligned} f(x) &= (x - 2)(x + 4) \\ g(x) &= 2 \cdot (x - 2)(x + 4) \end{aligned}$$

b)

$$\begin{aligned} f(x) &= x \cdot (x - 1)(x + 1) \\ g(x) &= \sqrt{5} \cdot x \cdot (x - 1)(x + 1) \end{aligned}$$

c)

$$\begin{aligned} f(x) &= x \cdot (x + 2) \\ g(x) &= \frac{1}{3} \cdot x \cdot (x + 2) \end{aligned}$$

d)

$$\begin{aligned} f(x) &= (x + 3)(x - \sqrt{2})(x - 3\sqrt{3}) \\ g(x) &= \pi \cdot (x + 3)(x - \sqrt{2})(x - 3\sqrt{3}) \end{aligned}$$

Aufgabe 8**a)**

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

$$2x - 1 = 0$$

$$2x = 1$$

$$x_1 = \frac{1}{2}$$

$$x + 2 = 0$$

$$x_2 = -2$$

$$x + 3 = 0$$

$$x_3 = -3$$

b)

$$-x^3 + 6x^2 - 9x = 0$$

$$x \cdot (-x^2 + 6x - 9) = 0$$

$$x_1 = 0$$

$$-x^2 + 6x - 9 = 0$$

$$x^2 - 6x + 9 = 0$$

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

$$x - 3 = 0$$

$$x_2 = 3$$

c)

$$x^4 - 5x^2 + 4 = 0$$

Sei $x^2 = z$

$$z^2 - 5z + 4 = 0$$

$$z_{1,2} = \frac{5}{2} \pm \sqrt{\left(\frac{5}{2}\right)^2 - 4}$$

$$= 2,5 \pm \sqrt{2,25}$$

$$= 2,5 \pm 1,5$$

$$z_1 = 2,5 + 1,5 = 4$$

$$z_2 = 2,5 - 1,5 = 1$$

$$x^2 = 4$$

$$x_{1,2} = \pm 2$$

$$x^2 = 1$$

$$x_{3,4} = \pm 1$$

Aufgabe 9

a)

$$f(x) = x \cdot (x - 2)(x - 5)$$

$$g(x) = 6x \cdot (x - 2)(x - 5)$$

b)

$$f(x) = (x - 4)(x - 4)(x + 1)$$

$$g(x) = -0,01 \cdot (x - 4)(x - 4)(x + 1)$$

c)

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

$$g(x) = 42 \cdot (x + 3)(x - 1)(x - 1)$$

d)

$$f(x) = (x - 3)(x - 3)(x - 3)$$

$$g(x) = \sqrt{7} \cdot (x - 3)(x - 3)(x - 3)$$