

Integral Aufgabe 151

Berechnen Sie den Flächeninhalt A zwischen $f(x) = x^3 - 6x^2 + 8x$ und $g(x) = x^2 - 4x$.

Schnittpunkte:

$$f(x) = g(x)$$

$$x^3 - 6x^2 + 8x = x^2 - 4x \quad | - x^2 + 4x$$

$$x^3 - 7x^2 + 12x = 0$$

$$x(x^2 - 7x + 12) = 0$$

$$x_1 = 0$$

Linearfaktoren:

$$(x^2 - 7x + 12) = (x - 4)(x - 3)$$

$$x_2 = 3$$

$$x_3 = 4$$

$$f(x) - g(x) = x^3 - 6x^2 + 8x - (x^2 - 4x) = x^3 - 7x^2 + 12x$$

$$A = \int_0^3 (x^3 - 7x^2 + 12x) dx + \int_3^4 (x^3 - 7x^2 + 12x) dx$$

$$A = \left| \frac{x^4}{4} - \frac{7x^3}{3} + 6x^2 \right|_0^3 + \left| \frac{x^4}{4} - \frac{7x^3}{3} + 6x^2 \right|_3^4$$

$$A = |20,25 - 63 + 54| + |64 - 149,33 + 96 - (20,25 - 63 + 54)|$$

$$A = |11,25| + |-0,58|$$

$$\mathbf{A = 11,83}$$

