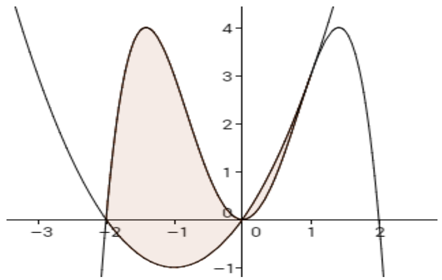
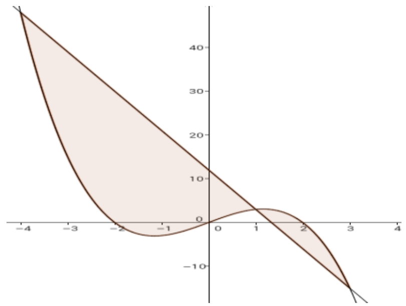
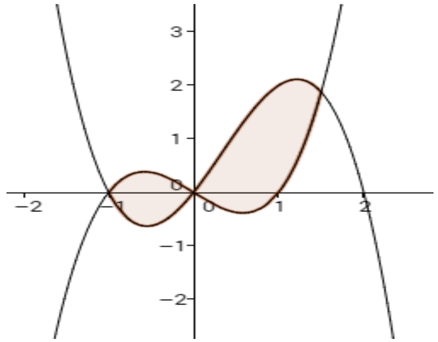
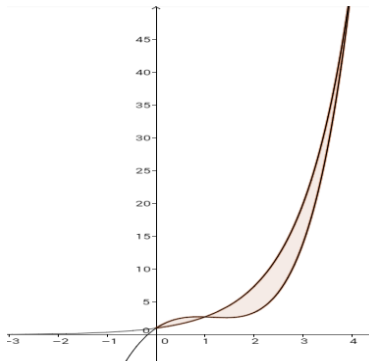
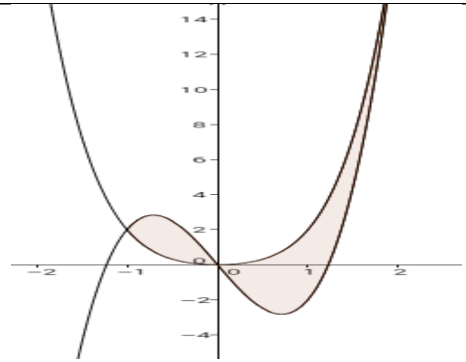
Lösungen zu der Berechnung der Fläche zwischen zwei Graphen

$f(x) = -x^4 + 4x^2$ $g(x) = x^2 + 2x$		Schnittpunkte: $S_1(-2/0)$; $S_2(0/0)$; $S_3(1/3)$ A = $\int_{-2}^{0} -x^4 + 4x^2 - (x^2 + 2x)dx + \int_{0}^{1} (x^2 + 2x) - (-x^4 + 4x^2)dx$ $= \int_{-2}^{0} -x^4 + 3x^2 - 2x\,dx + \int_{0}^{1} x^4 - 3x^2 + 2x\,dx$ $= \left[-\frac{1}{5}x^5 + \frac{3}{4}x^3 - x^2\right]_{-2}^{0} + \left[\frac{1}{5}x^5 - \frac{3}{4}x^3 + x^2\right]_{0}^{1}$ = 5,6 + 0,2 = 5,8
$f(x) = -x^3 + 4x$ $g(x) = -9x + 12$		Schnittpunkte: $S_1(-4/48)$; $S_2(1/3)$; $S_3(3/-15)$ A = $\int_{-4}^{1} -9x + 12 - (-x^3 + 4x)dx + \int_{1}^{3} -x^3 + 4x - (-9x + 12)dx$ $= \int_{-4}^{1} x^3 - 13x + 12\,dx + \int_{1}^{3} -x^3 + 13x - 12\,dx$ $= \left[\frac{1}{4}x^4 - 6{,}5x^2 + 12x\right]_{-4}^{1} + \left[-\frac{1}{4}x^4 + 6{,}5x^2 - 12x\right]_{1}^{3}$ = 93,75 + 8 = 101,75
$f(x) = x^3 - x$ $g(x) = -x^3 + x^2 + 2x$		Schnittpunkte: $S_1(-1/0)$; $S_2(0/0)$; $S_3(1{,}5/1{,}875)$ A = $\int_{-1}^{0} x^3 - x - (-x^3 + x^2 + 2x)dx + \int_{0}^{1{,}5} -x^3 + x^2 + 2x - (x^3 - x)dx$ $= \int_{-1}^{0} 2x^3 - x^2 - 3x\,dx + \int_{0}^{1{,}5} -2x^3 + x^2 + 3x\,dx$ $= \left[\frac{1}{2}x^4 - \frac{1}{3}x^3 - 1{,}5x^2\right]_{-1}^{0} + \left[-\frac{1}{2}x^4 + \frac{1}{3}x^3 + 1{,}5x^2\right]_{0}^{1{,}5}$ ≈ 0,67 + 1,97 ≈ 2,64

$f(x) = x^3 - 5x^2 + 4x + e^x$ $g(x) = e^x$		Schnittpunkte: $S_1(0/1)$; $S_2(1/e)$; $S_3(4/e^4)$ A = $\int_0^1 x^3 - 5x^2 + 4x + e^x - e^x\,dx + \int_1^4 e^x - (x^3 - 5x^2 + 4x + e^x)\,dx$ = $\int_0^1 x^3 - 5x^2 + 4x\,dx + \int_1^4 -x^3 + 5x^2 - 4x\,dx$ = $\left[\frac{1}{4}x^4 - \frac{5}{3}x^3 + 2x^2\right]_0^1 + \left[-\frac{1}{4}x^4 + \frac{5}{3}x^3 - 2x^2\right]_1^4$ = $0,58\overline{3} + 11,25 = 11,8\overline{3}$
$f(x) = x^4 + x^2$ $g(x) = 4x^3 - 6x$		Schnittpunkte: $S_1(-1/2)$; $S_2(0/0)$; $S_2(2/20)$; $S_3(3/90)$ A = $\int_{-1}^0 4x^3 - 6x - (x^4 + x^2)dx + \int_0^2 x^4 + x^2 - (4x^3 - 6x)\,dx$ $+ \int_2^3 4x^3 - 6x - (x^4 + x^2)dx$ = $\int_{-1}^0 -x^4 + 4x^3 - x^2 - 6x\,dx + \int_0^2 x^4 - 4x^3 + x^2 + 6x\,dx$ $+ \int_2^3 -x^4 + 4x^3 - x^2 - 6x\,dx$ = $\left[-\frac{1}{5}x^5 + x^4 - \frac{1}{3}x^3 - 3x^2\right]_{-1}^0 + \left[\frac{1}{5}x^5 - x^4 + \frac{1}{3}x^3 + 3x^2\right]_0^2$ $+\left[-\frac{1}{5}x^5 + x^4 - \frac{1}{3}x^3 - 3x^2\right]_2^3$ = $1,4\overline{6} + 5,0\overline{6} + 1,4\overline{6} \approx 8$