Lösungen erstellt von Frau Zepf

# Flächen oberhalb der x-Achse : Lösungen Blatt 8

(1) $f(x) = -2x^2 + 6x \quad [0; 3]$

**L**: $\int_0^3 f(x)\,dx = \int_0^3 (-2x^2+6x)\,dx = \left[-\frac{2}{3}x^3 + 3x^2\right]_0^3$

$= F(3) - F(0) = 9 - 0 = \underline{\underline{9}}$

(2) $f(x) = \frac{1}{3}x^3 - 3x \quad [-3; 0]$

**L**: $\int_{-3}^0 f(x)\,dx = \int_{-3}^0 (\frac{1}{3}x^3 - 3x)\,dx = \left[\frac{1}{12}x^4 - \frac{3}{2}x^2\right]_{-3}^0$

$= F(0) - F(-3) = 0 - (-6{,}75) = \underline{\underline{6{,}75}}$

(3) $f(x) = \frac{1}{6}x^3 - 2x^2 + 6x \quad [0; 8]$

**L**: $\int_0^8 f(x)\,dx = \int_0^8 (\frac{1}{6}x^3 - 2x^2 + 6x)\,dx$

$= \left[\frac{1}{24}x^4 - \frac{2}{3}x^3 + 3x^2\right]_0^8$

$= F(8) - F(0) = 21{,}\overline{3} - 0 = \underline{\underline{21{,}\overline{3}}}$

(4) $f(x) = (x-1)^2 - 1 \quad [2; 4]$

**L**: $\int_2^4 f(x)\,dx = \int_2^4 (x^2 - 2x)\,dx = \left[\frac{1}{3}x^3 - x^2\right]_2^4$

$= F(4) - F(2) = \frac{16}{3} - \left(-\frac{4}{3}\right) = \underline{\underline{\frac{20}{3}}}$

(5) $f(x) = \sin(x) \quad [0; \pi]$

**L**: $\int_0^\pi f(x)\,dx = \int_0^\pi (\sin(x))\,dx = \left[-\cos(x)\right]_0^\pi$

$= F(\pi) - F(0) = 1 - (-1) = \underline{\underline{2}}$