

Nr. 1) a) $f(x) = 0,5$ über $J = [0, 2]$

$f(x) \geq 0$ in $J = [0, 2]$

$\int_0^2 \frac{1}{2} dx = \left[\frac{1}{2}x \right]_0^2 = \frac{1}{2} \cdot 2 - 0 = 1 \Rightarrow f(x)$ ist Dichtefunktion

b) $P(X=1) = \int_1^1 \frac{1}{2} dx = 0$

$P(1 < X < 2) = P(1 \leq X \leq 2) = \int_1^2 \frac{1}{2} dx = \left[\frac{1}{2}x \right]_1^2 = 1 - \frac{1}{2} = \underline{\underline{\frac{1}{2}}}$

Nr. 2) a) $J = [0, 5]; f(x) = \frac{1}{5};$ b) $J = [0, 10]; f(x) = \frac{1}{10}$

c) $J = [-5, +5]; f(x) = \frac{1}{10};$ d) $J = [0, 0,2] = [0, \frac{1}{5}]; f(x) = 5$

Nr. 4) a) $f(x) = k \cdot (1-x^2); J = [-1, 1]; f(x) \geq 0$ für $k > 0$ in J

$1 = \int_{-1}^1 k \cdot (1-x^2) dx = 2 \cdot \int_0^1 (k - kx^2) dx = 2 \cdot \left[kx - \frac{kx^3}{3} \right]_0^1$

$= 2 \cdot \left[k \cdot 1 - \frac{k \cdot 1}{3} - \{0\} \right] = 2 \cdot \left[k \cdot \frac{2}{3} \right] = k \cdot \frac{4}{3} = 1 \Rightarrow \underline{\underline{k = \frac{3}{4}}}$

b) $P(0,4 < X \leq 0,9) = P(0,4 \leq X \leq 0,9) = \int_{0,4}^{0,9} \frac{3}{4} (1-x^2) dx =$

$\left[\frac{3}{4}x - \frac{3}{4} \cdot \frac{x^3}{3} \right]_{0,4}^{0,9} = \frac{3}{4} \cdot 0,9 - \frac{0,9^3}{4} - \left\{ \frac{3}{4} \cdot 0,4 - \frac{0,4^3}{4} \right\} = \underline{\underline{0,20875}}$

