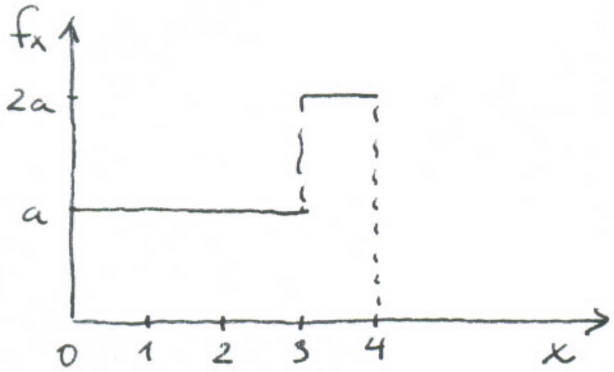
SEI / OVRS 24.1.2005

1) $f_X(x) = \begin{cases} a & 0 \le x < 3 \\ 2a & 3 \le x < 4 \end{cases}$



$P[-\infty < X < \infty] = 1$

$P[0 < X < 4] = 1$

$4 \cdot a + 1 \cdot a = 1$

$\underline{\underline{a = \frac{1}{5} = 0.2}}$

$F_X(x) = \int_{-\infty}^{x} f_X(\tilde{x})\,d\tilde{x} \Rightarrow$

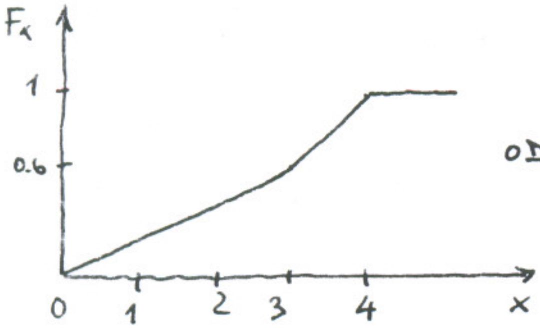
$\underline{0 \le x < 3}$

$F_X(x) = \int_0^x 0.2\,d\tilde{x} = 0.2x$

$3 \le x < 4$

$F_X(x) = \int_0^3 0.2\,d\tilde{x} + \int_3^x 0.4\,d\tilde{x} = 0.2x\Big|_0^3 + 0.4x\Big|_3^x = 0.6 + 0.4x - 1.2$

$F_X(x) = 0.4x - 0.6$



ODSEKOMA LINEARNA

$E[X] = \int_{-\infty}^{\infty} x f_X(x)\,dx = \int_0^3 x\,0.2\,dx + \int_3^4 x\,0.4\,dx = \frac{x^2}{2}0.2\Big|_0^3 + \frac{x^2}{2}0.4\Big|_3^4 =$

$= 9 \cdot 0.1 + 16 \cdot 0.2 - 9 \cdot 0.2 = 2.3$

$E[X^2] = \int_{-\infty}^{\infty} x^2 f_X(x)\,dx = \int_0^3 x^2 0.2\,dx + \int_3^4 x^2 0.4\,dx = \frac{x^3}{3}0.2\Big|_0^3 + \frac{x^3}{3}0.4\Big|_3^4 =$

$= 27/3 \cdot 0.2 + 64/3 \cdot 0.4 - 27/3 \cdot 0.4 = 6.73\dot{3}$

$var[X] = E[X^2] - E[X]^2 = 6.73\dot{3} - 2.3^2 = 1.44\dot{3}$