

1.

$$f(x) = \begin{cases} a \cdot (2x+1), & 0 \leq x \leq 1 \\ 0, & \text{αλλο} \end{cases}$$

Na $P(0 \leq X \leq 0,5)$.

$$\int_{-\infty}^{\infty} f(x)dx = 1 \Rightarrow \int_0^1 a(2x+1)dx = 1 \Rightarrow [x^2 + x]_0^1 = 1/a \Rightarrow 2 = 1/a \Rightarrow a = 1/2$$

$$f(x) = \frac{1}{2}(2x+1) = x + \frac{1}{2} > 0 \quad [0,1]$$

$$P(0 \leq X \leq 0,5) = \int_0^{0,5} (x + \frac{1}{2})dx = \frac{3}{8}, \quad E(X) = \int_{-\infty}^{\infty} xf(x)dx = \int_0^1 (x^2 + \frac{1}{2}x)dx = \frac{7}{12}$$

$$E(X^2) = \int_{-\infty}^{\infty} x^2 f(x)dx = \frac{5}{12}, \quad V(X) = E(X^2) - (E(X))^2 = \frac{11}{144}$$

2.

$$f(x) = \frac{(1+x)}{a} \quad 0 \leq x \leq 2$$

(i) $\{X < 1\}$ (ii) $\{X > 1,5\}$ (iii) $\{1 < X < 1,5\}$
 $\sqrt{5} - 1 \approx 1,236$
 $\int_{-\infty}^{\delta} f(x)dx = \frac{1}{2} \Rightarrow \int_0^{\delta} (1+x)/4 dx = \frac{1}{2} \rightarrow \dots \rightarrow \delta^2 + 2\delta - 4 = 0$

3. $f(x) = aX(1-x) \quad 0 \leq x \leq 1$ (. . .)

1) $= 6$ f(x)
 i) $\{X < 0,5\}$, ii) $\{X > 0,25\}$, iii) $\{0,25 < X < 0,5\}$

2) $= 6$

4. $f(x) = 3x^2/2 \quad -1 \leq x \leq 1$ (. . .)

$P(-0,5 < X < 0,5)$

5. 3.000 , 500

$$f(x) = \begin{cases} k \cdot x \cdot (10-3x), & 1 < x < 3 \\ 0, & x \leq 1 \quad x \geq 3 \end{cases}$$

() k
 () 500
 () $[\dots] P(X > 2,5)$