1) Fol o variab. exp, să se dea un alg de generare pt v. a X cu:

$$F(x) = \frac{1}{\sqrt{18\pi}} \int_{-\infty}^{x} e^{-\frac{t^2}{18} + \frac{t}{18} - \frac{1}{72}} dt, \quad x \in \mathbb{R}.$$

Avem $x \in \mathbb{R}$; dintre variabilele pe care le știm, doar variab. normală are dom pe $\mathbb{R}$. => este o variab. normală:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\frac{(x-\mu)^2}{\sigma^2}}$$

$$F(x) = \int_{-\infty}^{x} f(t)\,dt \Rightarrow \text{la noi } f(x) = \frac{1}{\sqrt{18\pi}} e^{-\frac{x^2}{18} + \frac{x}{18} - \frac{1}{72}}$$

$$\rightarrow -\left(\frac{t^2}{18} - \frac{t}{18} + \frac{1}{72}\right) = -\left(\frac{t}{3\sqrt2} - \frac{1}{6\sqrt2}\right)^2$$

$$\rightarrow \frac{1}{\sqrt{18\pi}} = \frac{1}{3\sqrt{2\pi}} \text{ egalăm cu } \frac{1}{\sigma\sqrt{2\pi}} \Rightarrow \underline{\sigma = 3}$$

$$\rightarrow \frac{1}{2}\frac{(x-\mu)^2}{9} = \left(\frac{x}{3\sqrt2} - \frac{1}{6\sqrt2}\right)^2 \quad | \cdot 9 \cdot 2$$

$$\left(\frac{2x-1}{6\sqrt2}\right)^2 = \frac{(2x-1)^2}{36\cdot 2}$$

$$\Rightarrow (x-\mu)^2 = \frac{(2x-1)^2}{4} \Rightarrow (x-\mu)^2 = \left(\frac{2x-1}{2}\right)^2 \Rightarrow$$

$$\Rightarrow (x-\mu)^2 = \left(x - \frac{1}{2}\right)^2 \Rightarrow \underline{\mu = \frac{1}{2}}$$

verificăm ...

Alg

P1. Se gen $U \sim U(0,1)$

P2. Se gen $Y \sim Exp(1)$

P3. Dacă $U \le e^{-\frac{Y^2}{2} + Y - 0,5}$ mergi la P4
altfel mergi la P1

P4. $X_1 = Y$

P5. Se gen $U \sim U(0,1)$

P7. $X = S X_1$

Ieșire: Variab. aleat. X