1) $f(x) = \begin{cases} 4(1-x)^3, & x \in [0,1] \\ 0, & \text{altfel} \end{cases}$

$\Rightarrow$ X are repartiția <u>maximului</u> $\Rightarrow f(x) = \begin{cases} n x^{n-1}, & x \in [0,1] \\ 0, & \text{altfel} \end{cases}$

cu $n = 4$.

<u>Alg</u>

P1. Se generează U_1, U_2, U_3, U_4 variab. aleat. indep. unif. pe $[0,1]$

P2. $Y = \max\{U_1, \dots, U_4\}$

Ieșire: Y cu rep. F (ca a lui X).

2) $f(x) = \frac{1}{\sqrt{2\pi}} e^{\left(-\frac{1}{2}x^2 + \frac{1}{2}x - \frac{1}{8}\right)}, x \in \mathbb{R}$

$x \in \mathbb{R} \Rightarrow$ avem o <u>rep. normală</u>: $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\frac{(x-\mu)^2}{\sigma^2}}$

$-\frac{1}{2}x^2 + \frac{1}{2}x - \frac{1}{8} = -\left(\frac{1}{2}x^2 - \frac{1}{2}x + \frac{1}{8}\right) = -\left(\frac{x}{\sqrt{2}} - \frac{1}{2\sqrt{2}}\right)^2$

la noi, σ se pare că e 1.

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

$\left(\frac{x-\mu}{\sqrt{2}}\right)^2 = \left(\frac{2x-1}{2\sqrt{2}}\right)^2 \Rightarrow \frac{x-\mu}{\sqrt{2}} = \frac{2x-1}{2\sqrt{2}} \quad | \cdot \sqrt{2}$

$x - \mu = \frac{2x-1}{2} \Rightarrow \cancel{2x} - 2\mu = \cancel{2x} - 1 \Rightarrow \mu = \frac{1}{2}$

Verificăm: $f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}\left(x - \frac{1}{2}\right)^2} = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{2x-1}{2}\right)^2}$

$= \frac{1}{\sqrt{2\pi}} e^{-\left(\frac{2x-1}{2\sqrt{2}}\right)^2} = \frac{1}{\sqrt{2\pi}} e^{-\left(\frac{x}{\sqrt{2}} - \frac{1}{2\sqrt{2}}\right)^2} \Rightarrow \mu = \frac{1}{2}, \sigma = 1$

corect.