$\therefore \infty$

Q2) $U(a,b) = \begin{cases} \frac{1}{b-a} & a \le x \le b \\ 0 & \text{otherwise} \end{cases}$

$\mu = \int_{-\infty}^{\infty} x\, U(x)\,dx \Rightarrow \mu = \int_a^b \frac{1}{(b-a)} x\,dx$

$= \frac{b+a}{2}$

$\sigma^2 = \left( \int_{-\infty}^{\infty} x^2 U(x)\,dx - \mu^2 \right) \Rightarrow \frac{1}{b-a}\int_a^b x^2\,dx - \left(\frac{b+a}{2}\right)^2$

$\sigma^2 = E(x^2) - (E(x))^2 = \frac{b^3-a^3}{3(b-a)} - \left(\frac{b+a}{2}\right)^2 = \frac{(b-a)^2}{12}$