

USE THIS AS REFERENCE DON'T COPY PASTE SAME



$$(i) \text{ Since } \int_0^1 f(x) dx = \int_0^1 6x(1-x) dx = 6 \left[\frac{x^2}{2} - \frac{x^3}{3} \right]_0^1$$

$= 1$, $f(x)$ is a p.d.f

$$(ii) F(x) = \begin{cases} 0, & \text{if } x < 0 \\ \int_0^x 6t(1-t) dt = (3x^2 - 2x^3), & 0 \leq x \leq 1 \\ 1, & \text{if } x > 1 \end{cases}$$

$$(iii) P\left(x \leq \frac{1}{2} \mid \frac{1}{3} \leq x \leq \frac{2}{3}\right)$$

$$= \frac{P\left(\frac{1}{3} \leq x \leq \frac{1}{2}\right)}{P\left(\frac{1}{3} \leq x \leq \frac{2}{3}\right)}$$

$$= \frac{\int_{1/3}^{1/2} 6x(1-x) dx}{\int_{1/3}^{2/3} 6x(1-x) dx}$$

$$\int_{1/3}^{2/3} 6x(1-x) dx$$