

accenture

$$y(x) = y = x^2$$

$$x \sim N(0,1) \rightarrow \mu = 0$$

$$\sigma^2 = 1$$

$$f_x(x) = \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{x^2}{2}}$$

$$F_y(y) = P(Y \leq y) = P(x^2 \leq y) = P(-\sqrt{y} \leq x \leq \sqrt{y}) =$$

$$F_y(y) = F_x(\sqrt{y}) - F_x(-\sqrt{y})$$

$$f_y(y) = \frac{dF_y(y)}{dy} = \frac{dF_x(\sqrt{y})}{dx} \cdot \frac{dx}{dy} - \frac{dF_x(-\sqrt{y})}{dx} \cdot \frac{dx}{dy}$$

$$f_y(y) = f_x(\sqrt{y}) \cdot \frac{dx}{dy} - f_x(-\sqrt{y}) \cdot \frac{dx}{dy}$$

$$\left| \begin{array}{l} x = \pm \sqrt{y} \\ dx = \pm \frac{1}{2\sqrt{y}} dy \end{array} \right.$$

$$f_y(y) = \frac{1}{\sqrt{2\pi}} \cdot e^{-y/2} \cdot \frac{1}{2\sqrt{y}} - \frac{1}{\sqrt{2\pi}} \cdot e^{-y/2} \cdot -\frac{1}{2\sqrt{y}}$$

$$f_y(y) = \frac{1}{\sqrt{2\pi y}} \cdot e^{-y/2} \quad \mathbb{I}\{y \geq 0\}$$