

أمثلة :

Example : if we know $x \sim N(3, 4)$:

1- Write the pdf of x

2- mgf of x

1-
$$f(x) = \frac{1}{\sqrt{2\pi \cdot 4}} e^{-\frac{1}{2 \cdot 4}(x-3)^2}, \quad -\infty < x < \infty$$

2-
$$M(t) = e^{(3t + \frac{4t^2}{2})}$$

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Example : if we know $M(t) = e^{(3t + \frac{4t^2}{2})}$:
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$$f(x) = \frac{1}{\sqrt{2\pi \cdot 4}} e^{-\frac{1}{2 \cdot 4}(x-3)^2}, \quad -\infty < x < \infty, \quad \text{is the pdf of } x$$

أمثلة :

مثال : اذا علمت ان $x \sim N(3,4)$ اوجد $P(-0.92 < X \leq 6.92)$ علما ان $N(1.96)=0.975$

$$\begin{aligned} P(-0.92 < X \leq 6.92) &= P\left(\frac{-0.92-3}{2} < \frac{X-3}{2} \leq \frac{6.92-3}{2}\right) = P(-1.96 < Z \leq 1.96) \\ &= N(1.96) - N(-1.96) = N(1.96) - [1 - N(1.96)] \\ &= 0.975 - 1 + 0.975 = 0.95 \end{aligned}$$

أمثلة :

مثال : اذا علمت ان $x \sim N(1,16)$ اوجد $P(X \geq 9)$ علما ان $N(2)=0.9772$

$$\begin{aligned} P(X \geq 9) &= 1 - P(X < 9) = 1 - P\left(\frac{X-1}{4} \leq \frac{9-1}{4}\right) \\ &= 1 - P(Z \leq 2) \\ &= 1 - N(2) \\ &= 1 - 0.9772 \\ &= 0.0228 \end{aligned}$$