Ex: If $Z \sim N(0,1)$ Find Constant t such that:

$P(0 \leq Z \leq t) = 0.4147$

$P(Z > t) = 0.05$

$P(0 \leq Z \leq t) = 0.4147$

$t = 1.37$

$\phi(1.37) = 0.4147$

$P(0 \leq Z \leq t) = P(Z > 0) - P(Z > t)$

$= 0.5 - 0.05 = 0.45$

$\phi(1.65) = 0.45$

$t = 1.65$

Ex: Let $X \sim N(70, 100)$, Find $P(60 \leq X \leq 90)$, $P(60 \leq X \leq 95)$

Sol.

$$Z = \frac{X - M}{\sigma} = \frac{X - 70}{\sqrt{100}}$$

$$P(60 \leq X \leq 90) = P\left(\frac{60-70}{\sqrt{100}} \leq Z \leq \frac{90-70}{\sqrt{100}}\right)$$

$$= P(-1 \leq Z \leq 2)$$

$$= \phi(2) + \phi(1) - 0.8185$$

$$P(60 \leq X \leq 95) = P\left(\frac{60-70}{\sqrt{100}} \leq Z \leq \frac{95-70}{\sqrt{100}}\right)$$

$$= P(-1 \leq Z \leq 2.5)$$

$$= \Phi(1) + \Phi(2.5) = 0.8351$$