Sia $X \sim N(46.76, 3.67)$

$\mu = 46.76$

$\sigma^2 = 3.67$

1- Calcolare $\Pr(46.92 \leq X < 47.07)$:

$$\Pr(46.92 \leq X < 47.07) = \int_{46.92}^{47.07} \frac{1}{\sqrt{2\pi\sigma^2}} \cdot e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} dx$$

$= 0.0309949878 \longrightarrow$ usando la formula della v.a. normale

$$\Pr(46.92 \leq X < 47.07) = \Pr\left(\frac{46.92 - 46.76}{\sqrt{3.67}} \leq Z < \frac{47.07 - 46.76}{\sqrt{3.67}}\right)$$

$= \Pr(0.0835193202 \leq Z < 0.1618186828)$

$= \Pr(Z < 0.1618186828) - \Pr(Z > 0.0835193202)$

$= 0.56356 - 0.53188$

$= 0.03168 \longrightarrow$ tabella

$$\Pr(0.085193202 \leq Z < 0.1618186828) = \int_{0.085}^{0.1618} \frac{1}{\sqrt{2\pi}} \cdot e^{\left(-\frac{1}{2} \cdot x^2\right)} dx$$

$= 0.0309949878 \longrightarrow$ usando la formula della v.a. normale standardizzata

$Z = \frac{X - \mu}{\sigma} \sim N(0,1)$

pnorm$(0.1618186828, 0, 1) -$ pnorm$(0.0835193202, 0, 1)$

Calcolare $Pr(X > 44.62)$:

$$Pr(X > 44.62) = 1 - Pr(X \leq 44.62)$$

$$= 1 - \int_{-\infty}^{44.62} \frac{1}{\sqrt{2\pi\sigma^2}} \cdot e^{-\frac{1}{2} \cdot \left(\frac{x-\mu}{\sigma}\right)^2} dx$$

$$= 1 - 0.1319820043$$

$$= \underline{0.8680179957} \longrightarrow \text{calcolata usando v.a. normale}$$

$$Pr(X > 44.62) = 1 - Pr\left(Z \leq \frac{44.62 - 46.76}{\sqrt{3.67}}\right)$$

$$= 1 - Pr(Z \leq -1.1170709011)$$

$$= 1 - \int_{-\infty}^{-1.11707} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2} dx \qquad \rightarrow 1 - pnorm(-1.1170709011, 0, 1)$$

$$= 1 - 0.1319820043 = \underline{0.8680179957} \longrightarrow \text{calcolata usando v.a. normale standardizzata}$$

$$Pr(X > 44.62) = Pr(Z > -1.1170709011)$$

$$= 1 - Pr(Z \leq -1.1170709011)$$

$$= 1 - 0.1335 = \underline{0.8665} \longrightarrow \text{usando tabella}$$

3 - Calcolare $Pr(|X| \leq 46.97)$:

$$Pr(|X| \leq 46.97) = Pr(-46.97 \leq X \leq 46.97) \qquad pnorm(46.97, 46.76, \sqrt{3.67}) - pnorm(-46.97, 46.76, \sqrt{3.67})$$

$$= Pr(-48.9266 \leq Z \leq 0.1096191)$$

$$= \int_{-\infty}^{0.1096191} \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{1}{2}x^2} - \left(1 - \int_{-\infty}^{-48.9266} \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{1}{2}x^2}\right) = 0.5436443 - 1 + 1$$

$$= \underline{0.5436443}$$

$$pnorm(0.1096191, 0, 1) - pnorm(-48.9266, 0, 1)$$