

# Quiz - Solutions

#1. a)  $X \sim N(32, 3^2)$

$\bar{x} = 32$

$x = 44$

$\sigma = 3$

$\therefore z = \frac{x - \bar{x}}{\sigma}$

$= \frac{44 - 32}{3}$

$= \frac{12}{3}$

$= 4$

$\therefore P(z \leq 4) = 1$

so Mr. Mu is in the 100th percentile.

b) i.  $x = 28$

$z = \frac{x - \bar{x}}{\sigma}$

$= \frac{28 - 32}{3}$

$= -1.33$

ii.  $\therefore P(x > 28) = 1 - P(x \leq 28)$

$= 1 - P(z \leq -1.33)$

$= 1 - 0.0918$

$= 0.9082$

$= 90.82\%$

$\therefore 90.82\%$  of inseams have a greater length than Mr. Epsik

c)  $P(29 \leq x \leq 36) = P(x \leq 36) - P(x \leq 29)$

$= P\left(z \leq \frac{36 - 32}{3}\right) - P\left(z \leq \frac{29 - 32}{3}\right)$

$= P\left(z \leq \frac{4}{3}\right) - P(z \leq -1)$

$= 0.9082 - 0.1587$

$= 0.7495$

$= 74.95\%$

$= 75\%$

$\therefore 75\%$  of the time, the next customer will have an inseam between 29" and 36"

#2.  $X \sim N(51.15, 0.70^2)$

$P(\text{outside the range}) = 1 - P(49.75 \leq x \leq 52.55)$

$= 1 - [P(x \leq 52.55) - P(x \leq 49.75)]$

$= 1 - \left[ P\left(z \leq \frac{52.55 - 51.15}{0.7}\right) - P\left(z \leq \frac{49.75 - 51.15}{0.7}\right) \right]$

$= 1 - [P(z \leq 2) - P(z \leq -2)]$

$= 1 - (0.9772 - 0.0228)$

$= 0.0456$

$= 4.56\%$

$\therefore 4.56\% > 4\%$   
 $\therefore$  More than 4% of the pant lengths are distributed outside the range