7.

1. The mean height of 500 male students in a certain college is 151 cm and the standard deviation is 15 cm. Assuming the heights are normally distributed, find how many students have heights between 120 and 155cm.

A. $\mu = 151 \quad \sigma = 15$

$P(120 < X < 155) = ?$

We know $z = \frac{X - \mu}{\sigma}$

$P(120 < 15X + 151 < 155)$

$P\left(\frac{-31}{15} < X < \frac{4}{15}\right) = P(-2.067 < X < 0.267)$

$= 0.6026 - 0.0197$

$= 0.5829$

$\Rightarrow$ For 500 students, 500×0.5829

$\simeq 292$

2. An aptitude test for selecting officers in a bank is conducted on 1000 candidates. The average score is 42 and the standard deviation of the score is 24. Assuming a normal distribution for the scores, find

i)The number of candidates whose scores exceed 60

ii) The number of candidates whose scores lie between 30 and 60.

A. $\mu = 42 \quad \sigma = 24$

i) $P(X > 60) = 1 - P(X \leq 60)$

$= 1 - P(24z + 42 \leq 60)$

$= 1 - P(z \leq 0.75)$

$= 1 - 0.7734 = 0.2266$

For 1000, $1000 \times 0.2266 = 226.6$

ii) $P(30 < X < 60) = P(30 < 24z + 42 < 60)$

$= P\left(\frac{-12}{24} < z < \frac{18}{24}\right)$

$= P(-0.5 < z < 0.75)$

$= 0.7734 - 0.3085$

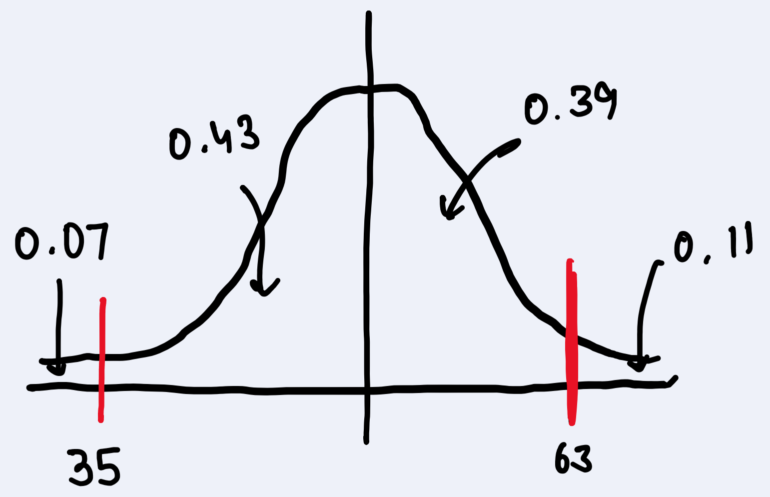
$= 0.4649$

For 1000, $1000 \times 0.4649 = 464.9$

3. In a normal distribution, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution?

A. $P(x < 35) = 0.07$

$P(x < 63) = 0.89 \qquad \mu = ? \quad \sigma = ?$



Area b/w μ & $X = 35$ $= 0.43$

Corresponding $z_1 = -1.48$

$-1.48 = \frac{35 - \mu}{\sigma} \Rightarrow \mu - 1.48\sigma = 35$

Area b/w μ & $X = 63$ $= 0.39$

Corresponding $z_2 = 1.23$

$1.23 = \frac{63 - \mu}{\sigma} \Rightarrow \mu + 1.23\sigma = 63$

$\mu = 50.29, \quad \sigma = 10.33$