

Answer on Question #77630 – Math – Statistics and Probability

Question

In a distribution exactly 7% of the items are under 35 and 89% are under 63. What is the mean and sd of the distribution?

Solution

If x is normally distributed, $N(m, s)$, then it is given that $P(x < 35) = 0.07$ and $P(x < 63) = 0.89$, hence $P(x > 63) = 0.11$

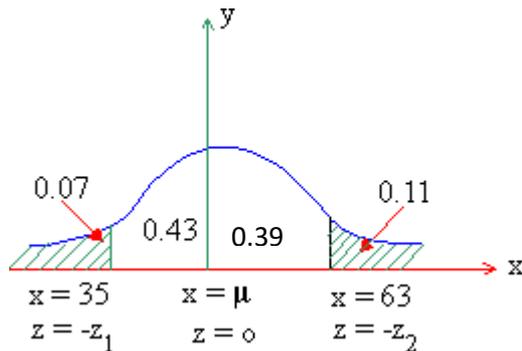


Figure 1

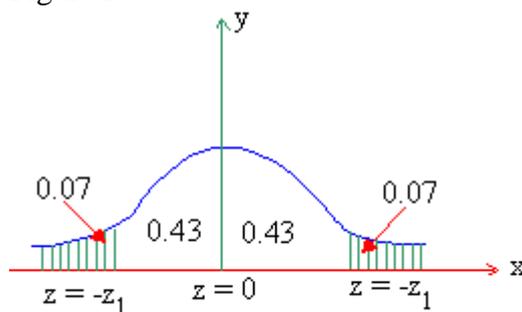


Figure 2

The points $x = 63$ and $x = 35$ are shown in Figure 1. Since $x = 35$ is located to the left of mean $x = \mu$ the corresponding value of z is negative. When $x = 63$, z is given by $z_2 = \frac{63-\mu}{\sigma}$ and when $x = 35$, $-z_1 = \frac{35-\mu}{\sigma}$.

From Figure 1 and Figure 2, we have

$$P(0 < z < z_2) = 0.39 \text{ and } P(0 < z < z_1) = 0.43$$

From the table we have $z_2 = 1.23$ and $z_1 = 1.48$

$$1.23 = \frac{63-\mu}{\sigma} \text{ and } -1.48 = \frac{35-\mu}{\sigma}$$

That is,

$$1.23\sigma + \mu = 63 \quad (1)$$

and

$$-1.48\sigma + \mu = 35 \quad (2)$$

Solving (1) and (2) we get $\mu = 50.3$ and $\sigma = 10.33$.

Answer: $\mu = 50.3$ and $\sigma = 10.33$