Answer on Question #34559 – Math – Statistics and Probability

The quartiles of a normal distribution are 10 and 18 respectively. Find the approximate mean and standard deviation of the distribution?

Solution

We know that $Q_1 = 10$ and $Q_3 = 18$ are quartiles of normal distribution.

Since normal distribution is symmetric, the mean equals

$$\mu = \frac{Q_1 + Q_3}{2} = \frac{10 + 18}{2} = 14$$

Now we know that

$$P(\xi < Q_1) = 0.25$$

Here ξ has normal distribution with parameters which we want to find.

$$P(\xi < Q_1) = \Phi\left(\frac{Q_1 - \mu}{\sigma}\right) = \Phi\left(\frac{10 - 14}{\sigma}\right) = 0.25$$

$$-\frac{4}{\sigma} = \Phi^{-1}(0.25) = -0.67449$$

Value of $\Phi^{-1}(0.25)$ can be found in any table of standard normal distribution.

So

$$\sigma = \frac{4}{0.67449} = 5.93041$$

So parameters of normal distribution are: mean = 14 and

standard deviation = 5.93041.