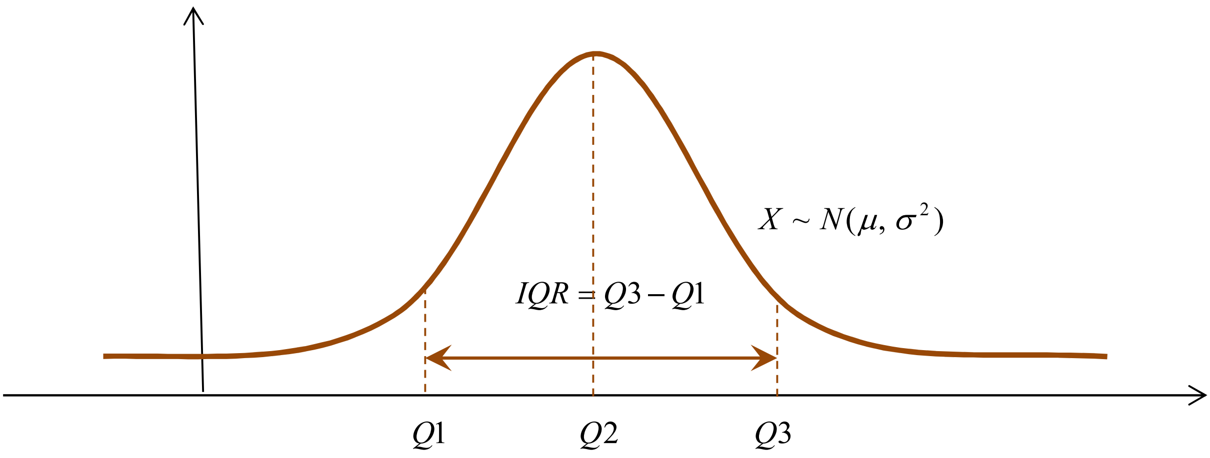
How does one compute the interquartile range, ie the difference between the 25th percentile and 75th percentile for a given normal distribution with known mean and variance? Well, it is actually very straightforward and the process is detailed as follows:



Let the 25th and 75th percentiles be a and b respectively.

Then $P(X < a) = 0.25 \Rightarrow a = invNorm(0.25,\ \mu,\ \sigma)$*

and $P(X < b) = 0.75 \Rightarrow b = invNorm(0.75,\ \mu,\ \sigma)$*

As such, $\boxed{IQR = Q3 - Q1 = b - a}$

*These cited are mere graphic calculator commands; alternatively you may consult a standard normal distribution table to arrive at a and b.

For normal curves specifically **centered about the vertical axis**, owing to symmetry, the interquartile range is simply twice that of the 75th percentile,

ie $\boxed{IQR = Q3 - Q1 = 2Q_3}$

Adding on, did you also know that **the interquartile range for a normal distribution is approximately 1.35 times its standard deviation**? Let's see how this is true.

Once again, we establish that $P(X < a) = 0.25$ and $P(X < b) = 0.75$

Standardizing X to the random variable Z for both equations,

$$P\left(Z < \frac{a-\mu}{\sigma}\right) = 0.25$$

$$P\left(Z < \frac{b-\mu}{\sigma}\right) = 0.75$$

$$\frac{a-\mu}{\sigma} = invNorm(0.25) = -0.675$$

$$\frac{b-\mu}{\sigma} = invNorm(0.75) = 0.675$$

$$a = -0.675\sigma + \mu ------(1)$$

$$b = 0.675\sigma + \mu ------(2)$$

Subtracting (1) from (2) therefore yields $b - a = IQR = 1.35\sigma$ (shown)