

Explanation for Z-score

pnorm

If $X \sim N(\mu, \sigma^2)$, with mean value μ , SD σ

Question: How to calc $P(X \geq x)$?

When we have standard normal random variable $Y \sim N(0, 1)$,

We can use `pnorm()` to calc probability: $\text{pnorm}(y) = P(Y \leq y)$

In order to answer previous question, we introduce Z-score.

$$\begin{aligned}\text{Z-score } z &= \frac{x - \mu}{\sigma} \\ \therefore x &= \mu + z * \sigma\end{aligned}$$

And we have this equation:

$$P(X \geq x) = P(Y \geq z) = 1 - \text{pnorm}(z),$$

qnorm

Assume that $P(X < x) = q$, we want to know the value of x .

Again, consider standard normal r.v. first, if we have

$P(Y < z) = q$, what is z ?

