

Inverse Normal Distribution

We now know how to use a calculator to value of the variable to obtain a probability. But we might want to do the reverse: given a probability of being in a region, how do we find the value of the boundary?

[Textbook] $X \sim N(20, 3^2)$. Find, correct to two decimal places, the values of a such that:

- a. $P(X < a) = 0.75$
- b. $P(X > a) = 0.4$
- c. $P(16 < X < a) = 0.3$

b



c



a

- 1. MODE → Distributions
- 2. Choose 'Inverse Normal'.
- 3. Put the area as 0.75 (this is the area up to the a value to determine). Put $\mu = 20$ and $\sigma = 3$.
- 4. You should get **22.0235**.

DRAW A SKETCH!

Further Example

If the IQ of a population is distributed using $X \sim N(100, 15^2)$.

- a. Determine the IQ corresponding to the top 30% of the population.
- b. Determine the interquartile range of IQs.

Test Your Understanding

$X \sim N(80, 7^2)$. Using your calculator,

- determine the a such that $P(X > a) = 0.65$
- determine the b such that $P(75 < X < b) = 0.4$
- determine the c such that $P(c < X < 76) = 0.2$
- determine the interquartile range of X .