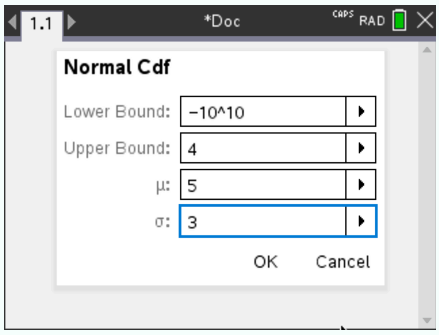
4.9 Normal distribution

In the following subsections, we will only compute probabilities involving "$\leq$". However, since the normal distribution is continuous, you could replace all the "$\leq$" by a "$<$", and the result would be the same.

4.9.1 Compute $\mathbf{P}(X \leq a)$ with Normal Cdf function

Consider a random variable $X \sim \mathcal{N}(5, 3^2)$.[1] Suppose you want to compute $\mathbf{P}(X \leq 4)$.

Press menu, select Probability > Distributions > Normal Cdf, choose a huge negative value for **lower** (like -10^{10}), and **upper** : 4 (here $\mu = 5$ and $\sigma = 3$):



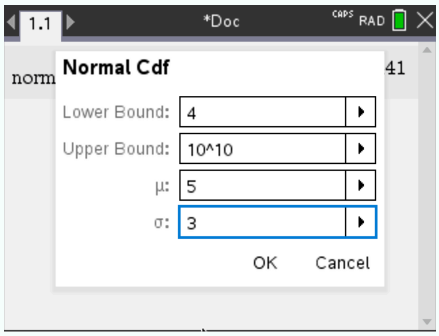
Press then enter.

Here the result should be 0.369 (rounded).

4.9.2 Compute $\mathbf{P}(X \geq a)$ with Normal Cdf function

Consider a random variable $X \sim \mathcal{N}(5, 3^2)$. Suppose you want to compute $\mathbf{P}(X \geq 4)$.

Press menu, select Probability > Distributions > Normal Cdf, choose a huge positive value for **upper** (like 10^{10}), and **lower** : 4 (here $\mu = 5$ and $\sigma = 3$):



[1] The IB notation for the normal distribution is $\mathcal{N}(\mu, \sigma^2)$, but the TI-Nspire works with σ. We write 3^2 to express that $\sigma = 3$.

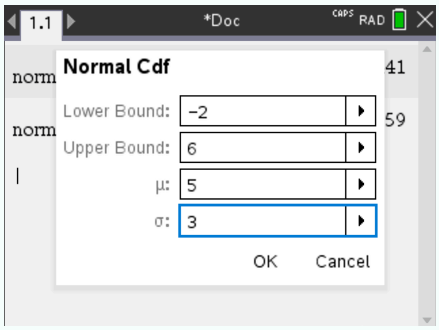
Press then enter .

Here the result should be 0.631 (rounded).

4.9.3 Compute $\mathbf{P}(a \leq X \leq b)$ with Normal Cdf function

Consider a random variable $X \sim \mathcal{N}(5, 3^2)$. Suppose you want to compute $\mathbf{P}(-2 \leq X \leq 6)$.

Press menu , select Probability > Distributions > Normal Cdf, choose **upper** : 6, and **lower** : -2 (here $\mu = 5$ and $\sigma = 3$):

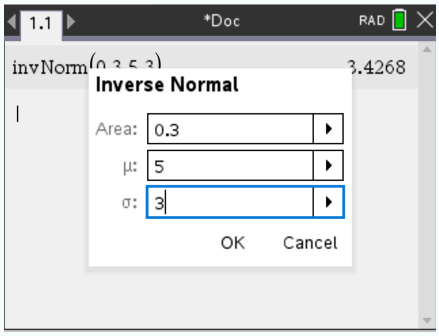


Press then enter . The result should be 0.621 (rounded).

4.9.4 Find x when $\mathbf{P}(X \leq x) = c$ with Inverse Normal function

Consider a random variable $X \sim \mathcal{N}(5, 3^2)$. Suppose you want to know for what x we have $\mathbf{P}(X \leq x) = 0.3$.

Press menu , select Probability > Distributions > Inverse Normal, choose as **Area**: 0.3 (here $\mu = 5$ and $\sigma = 3$):



Press then enter . The result should be $x = 3.43$ (rounded).

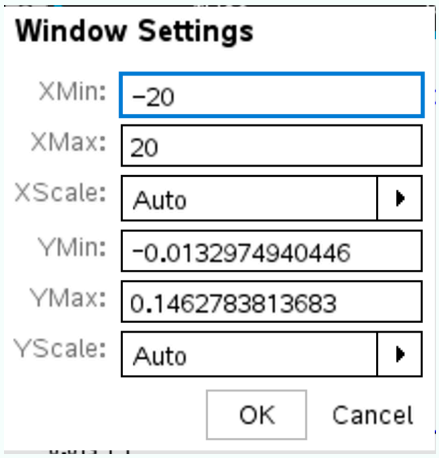
4.9.5 Plot a normal distribution

Consider a random variable $X \sim \mathcal{N}(5, 3^2)$.

① To plot the distribution in the calculator, create a new document and select Add Graphs.

② Enter '**f1(x)=normPdf(x,5,3)**'. Press enter.

③ Choose an appropriate window. Here we chose the following:



The graph should look like this: