Chapter 13 / **Example 11**

Using the inverse normal function

The inverse normal function uses the lower-tail area. Care should be taken when calculating with this function to ensure the correct tail is being used.

For $X \sim \mathrm{N}(21, 9)$

1 Find x given that:

a $\mathrm{P}(X < x) = 0.8$ **b** $\mathrm{P}(X > x) = 0.4$

2 **a** Find a and b given that $\mathrm{P}(a < X < b) = 0.68$ and a and b are an equal distance either side of the mean.

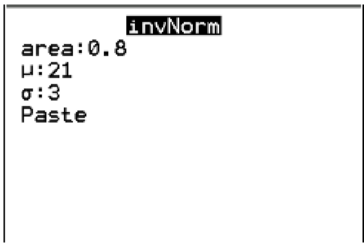
b Verify that this supports the statement that approximately 68% of all data for a normally distributed population is likely to lie within one standard deviation of the mean.

Press 2nd vars ([distr]) 3:invNorm(.

Enter the Area 0.8.

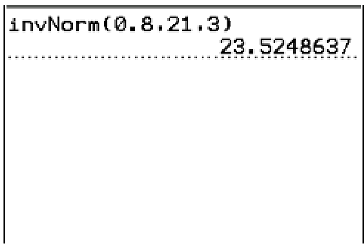
Set μ to 21 and σ to 3.

Navigate to Paste and press enter.



Press enter.

x = 23.5.



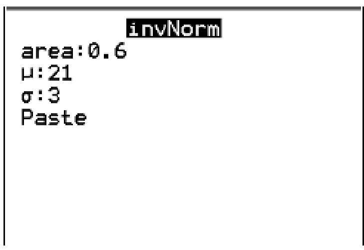
To use the inverse normal function, find $1 - \mathrm{P}(X < x) = 0.4$, that is $\mathrm{P}(X < x) = 1 - 0.4 = 0.6$.

Press 2nd vars ([distr]) 3:invNorm(.

Enter the Area 0.6.

Leave μ as 21 and σ as 3.

Navigate to Paste and press enter.

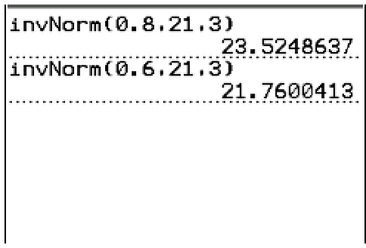


Chapter 13 / **Example 11**

Using the inverse normal function

Press [enter].

x = 21.8.



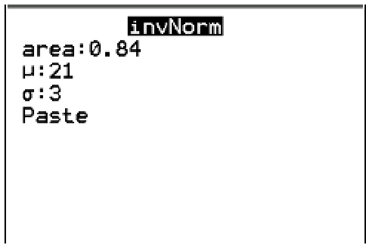
$P(x < b) = 0.5 + \frac{0.68}{2} = 0.84$.

Press [2nd] [vars] ([distr]) 3:invNorm(

Enter the Area 0.84.

Leave μ as 21 and σ as 3.

Navigate to Paste and press [enter].



Press [enter].

b = 24.0.

$a = 21 - (24.0 - 21) = 18.0$.

$18.0 = \mu - \sigma$, $24.0 = \mu + \sigma$.