Section 3.5b – Applying the Normal Distribution

MDM4U
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Height of cacti are normally distributed with a mean of 1.4 m and a standard deviation of 0.3 m.

$X \sim N(1.4, 0.3^2)$

1. 68% of the cacti are between...

68% will be within one standard deviation of the mean.

$1.4 - 0.3 = 1.1$
$1.4 + 0.3 = 1.7$

Therefore, 68% of cacti should be between 1.1 and 1.7 m tall.

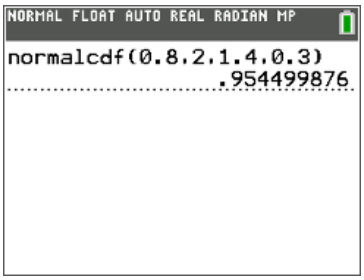
2. What percent of cacti are between 0.8 and 2m tall?

Based on the Emperical Rule, 95% of cacti should be between 0.8 and 2 m tall.

Using technology:

Normalcdf(lower=0.8, upper = 2.1, $\mu = 1.4, \sigma = 0.3$) = 0.954

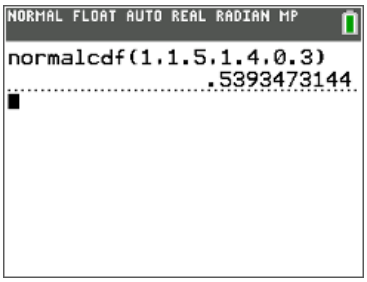
approximately 95.4% of cacti should be between 0.8 and 2 m tall.



3. What percent of cacti are between 1.0 and 1.5 meters tall?

Normalcdf(lower=1, upper = 1.5, $\mu = 1.4, \sigma = 0.3$) = 0.539

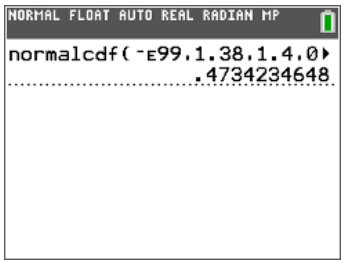
approximately 53.9% of cacti should be between 1 and 1.5 m tall.



4. What percent of cacti are less than 1.38 meters tall?

Normalcdf(lower = -E99, upper = 1.38, $\mu = 1.4, \sigma = 0.3$) = 0.473

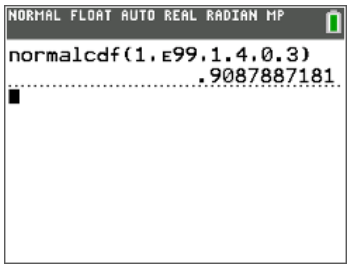
approximately 47.3% of cacti should be less than 1.38 m tall.



5. What percent of cacti are likely more than 1.0 meters tall?

Normalcdf(lower = 1, upper = E99, $\mu = 1.4, \sigma = 0.3$) = 0.9088

approximately 90.88% of cacti should be more than 1m tall.



6. Find the 90th percentile of cactus height...

invnorm(area = 0.9, $\mu = 1.4, \sigma = 0.3$) = 1.78

A 1.78 m tall cacti would be in the 90th percentile.