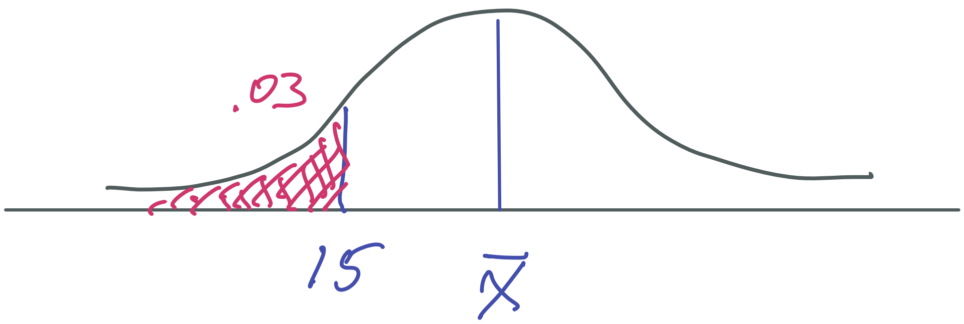
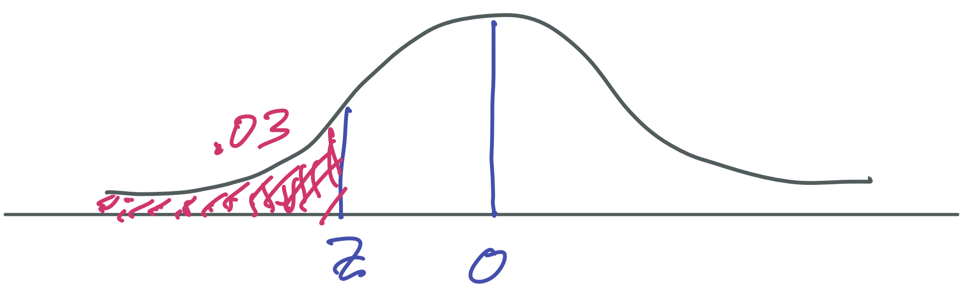
2. The weights of ripe watermelons grown at Mr. Smith's farm are normally distributed with a standard deviation of 2.8 lb. Find the mean weight of Mr. Smith's ripe watermelons if only 3% weigh less than 15 lb.





$$\text{invNorm}(.03, 0, 1) = -1.8808$$

$$-1.8808 = \frac{15 - \bar{x}}{2.8}$$

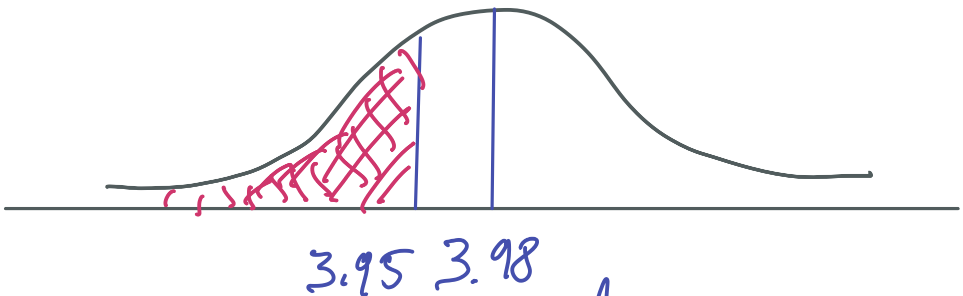
$$(2.8)(-1.8808) = 15 - \bar{x}$$

$$\boxed{\bar{x} = 20.2662 \text{ lbs}}$$

3. At some fast-food restaurants, customers who want a lid for their drinks get them from a large stack near the straws, napkins, and condiments. The lids are made with a small amount of flexibility so they can be stretched across the mouth of the cup and then snugly secured. When lids are too small or too large, customers can get very frustrated, especially if they end up spilling their drinks.

At one particular restaurant, large drink cups require lids with a "diameter" of between 3.95 and 4.05 inches. The restaurant's lid supplier claims that the diameter of its large lids follows a Normal distribution with mean 3.98 inches and standard deviation 0.02 inch. Assume that the supplier's claim is true.

a) What percent of large lids are too small to fit?

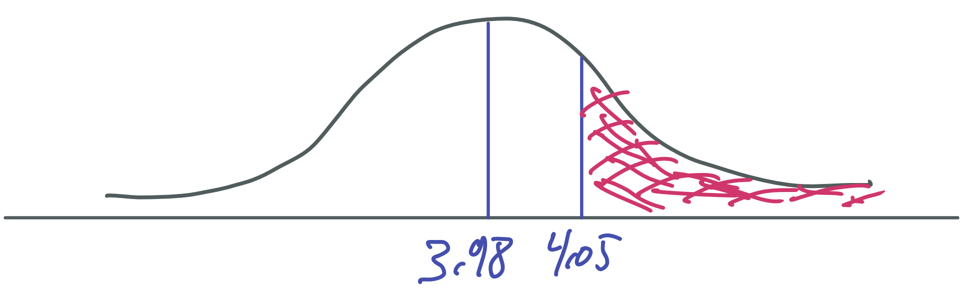


$S = .02$

normalcdf$(-E99, 3.95, 3.98, .02) = .0668$

$= \boxed{6.68\%}$

b) What percent of large lids are too big to fit?



normalcdf$(4.05, E99, 3.98, .02) = .00023$

$= \boxed{.023\%}$

c) Compare your answers to parts (a) and (b).

Does it make sense for the lid manufacturer to try to make one of these values larger than the other? Why or why not?

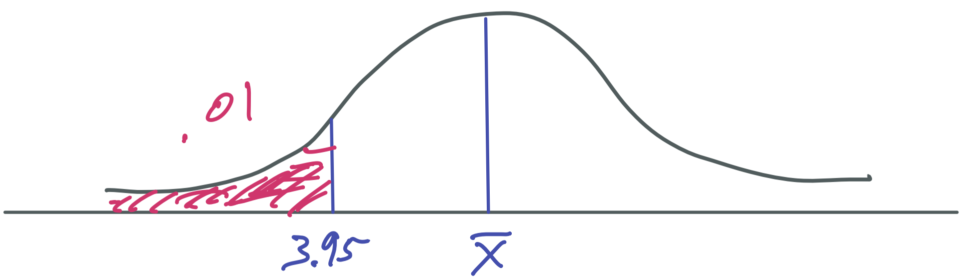
It is virtually impossible for a large lid to be too big. It makes sense to have a larger proportion of lids that are too small rather than too big. If lids are too small, customers will just try another lid. But, if lids are too large, the customer may not notice and then spill the drink

3) continued

The supplier is considering two changes to reduce to 1% the percentage of its large-cup lids that are too small. One strategy is to adjust the mean diameter of its lids.

Another option is to alter the production process, thereby decreasing the standard deviation of the lid diameters.

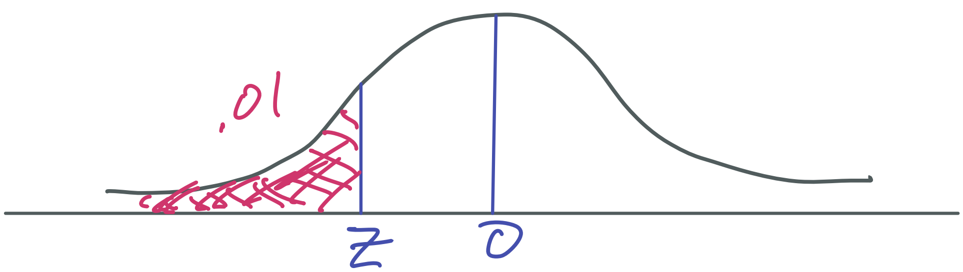
d) If the standard deviation remains at σ=0.02 inch, at what value should the supplier set the mean diameter of its large-cup lids so that only 1% are too small to fit?



$$-2.3263 = \frac{3.95 - \bar{x}}{.02}$$

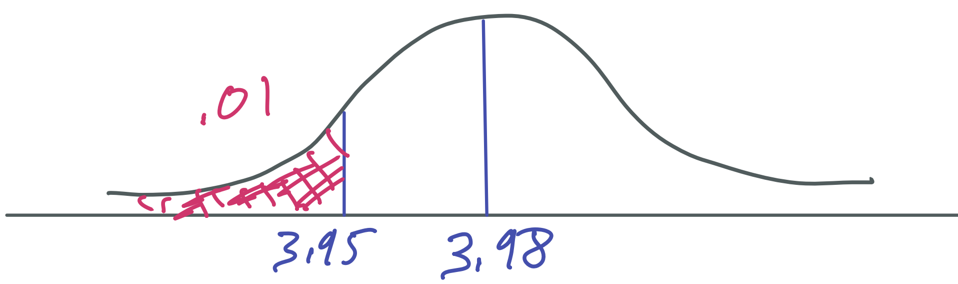
$$(.02)(-2.3263) = 3.95 - \bar{x}$$

$$\boxed{\bar{x} = 3.9965 \text{ inches}}$$



invNorm(.01, 0, 1) = −2.3263

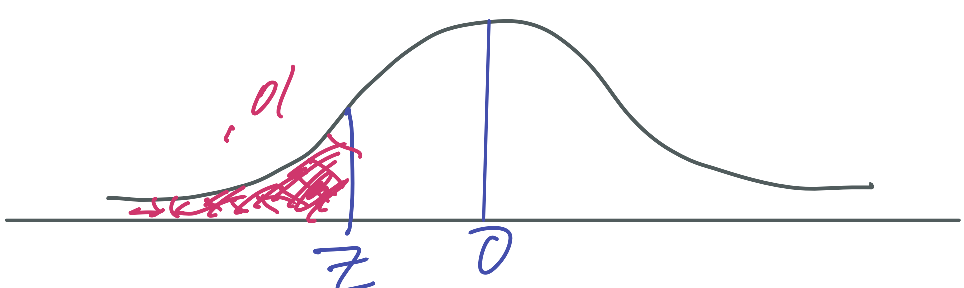
e) If the mean diameter stays at μ=3.98 inches, what value of the standard deviation will result in only 1% of lids that are too small to fit?



$$-2.3263 = \frac{3.95 - 3.98}{s}$$

$$s = \frac{3.95 - 3.98}{-2.3263}$$

$$= \boxed{.0129 \text{ inches}}$$



invNorm(.01, 0, 1) = −2.3263