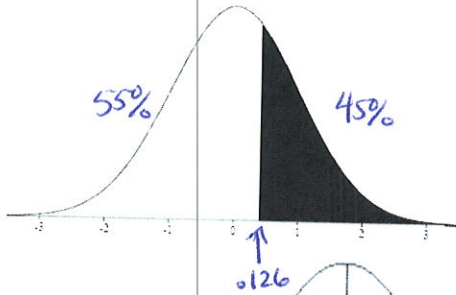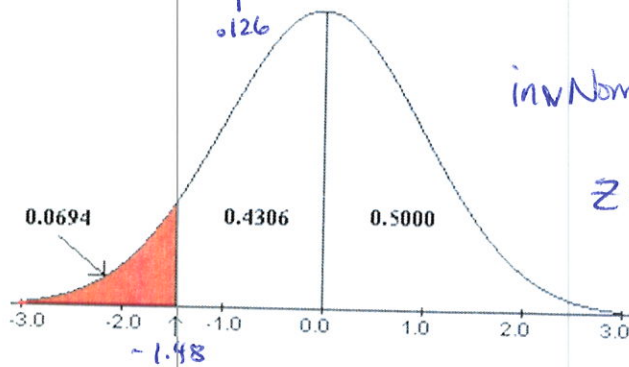MAT 223, Discussion Questions 10.28

For each of the problems below, the percentage under the curve is indicated. Find the z or x cut-off values for the region given the mean and the specified standard deviation.

1. The area under the curve is 45%. With mean of 0 and the standard deviation is 1.
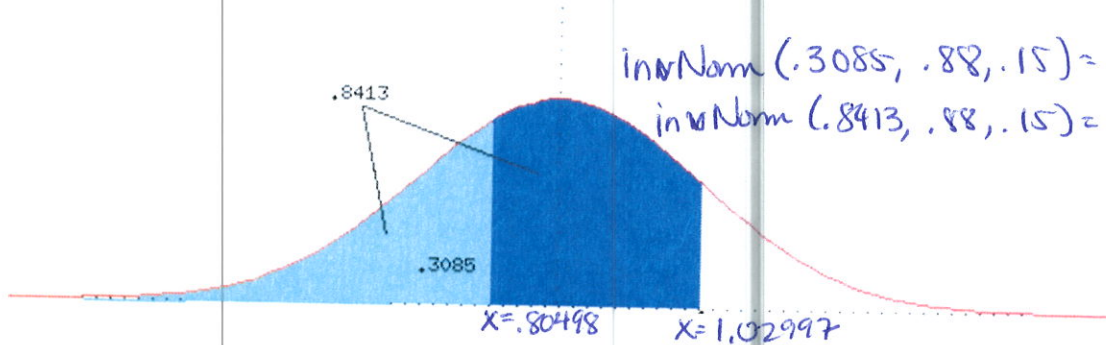
55%   45%

invNorm$(.55) = .12566...$

$Z = .126$

.126

invNorm$(.0694) = -1.48...$

$Z = -1.48$

0.0694   0.4306   0.5000
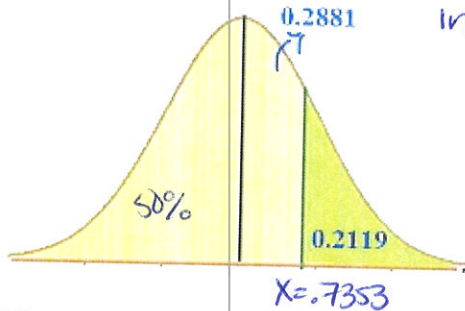
2.   -3.0   -2.0   -1.0   0.0   1.0   2.0   3.0

-1.48

3. Assume the mean is 0.88, and the standard deviation is 0.15.

invNorm$(.3085, .88, .15) = .80498...$

invNorm$(.8413, .88, .15) = 1.02997$

.8413

.3085

X = .80498   X = 1.02997

4. Assume the mean is 0.72 and the standard deviation is 0.02.

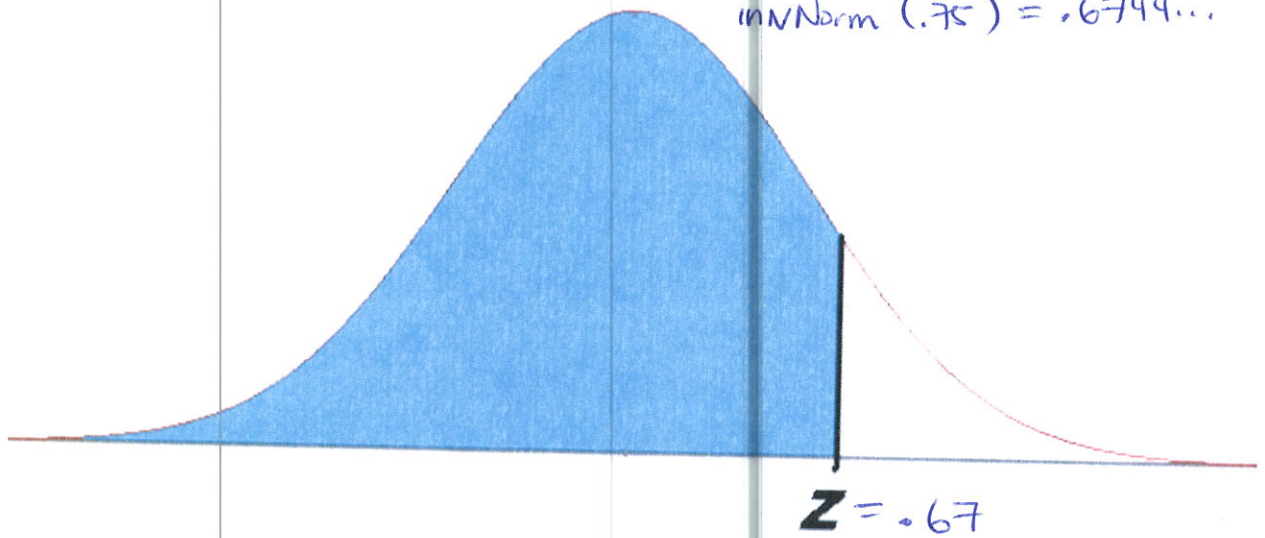0.2881

invNorm$(.7881, .72, .02) = .7353 = x$

50%

0.2119

X = .7353

5. The mean is 250, and the standard deviation is 5.
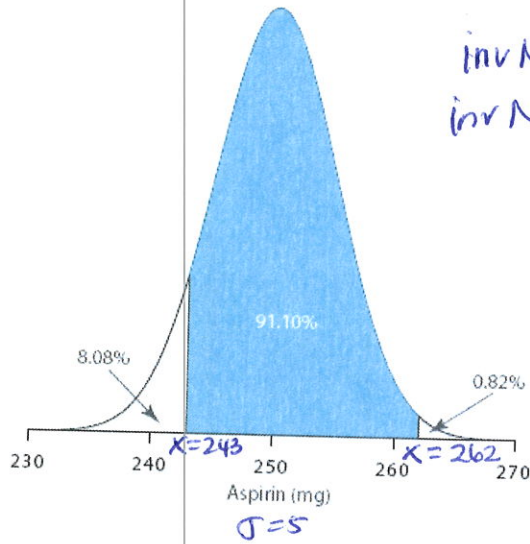
$\text{inv Norm}(.0808, 250, 5) = 243$

$\text{inv Norm}((1-.0082), 250, 5) = 261.999...$

91.10%

8.08%

0.82%

X=243

X = 262

230   240   250   260   270

Aspirin (mg)

$\sigma = 5$

6. What is z if the shaded area is 75%?
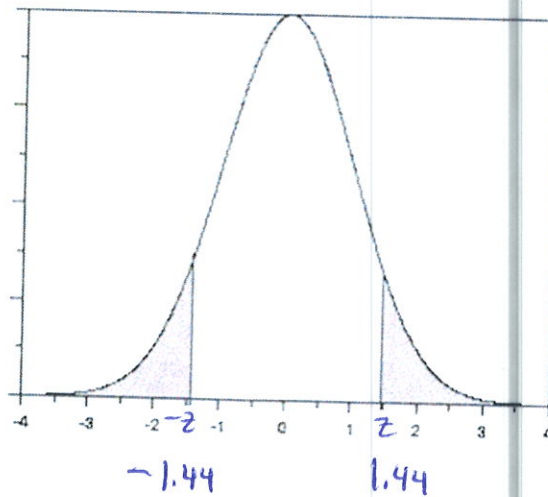
$\text{invNorm}(.75) = .6744...$

$Z = .67$

7. What is the z score (same but for the sign on both sides) if the probability of the shaded region is 15%?

$\dfrac{15\%}{2} = 7.5\%$

$\text{inv Norm}(.075) =$

$-1.4395...$

-4   -3   -2 ^{-}Z -1   0   1 Z 2   3   4

-1.44 1.44

8. If a school wants to accept only the top 5% of SAT and ACT scorers, what are the cut-off values for the two tests? Recall that the SAT has a mean of 1498 and a standard deviation of 199 (total score), and the ACT has a mean of 21 and a standard deviation of 5.2. Draw a sketch of the normal distribution and label it appropriately.

$invNorm(.95, 1498, 199) = 1825.3258...$

1825 or higher

$invNorm(.95, 21, 5.2) = 29.55...$

30 or higher

9. Comment on the article at http://www.edutopia.org/blog/high-costs-neuromyths-in-education-judy-willis