VI. Using a z table to answer questions about a range for the random variable given a probability

A. Determine the problem's relevant probability. Locate the row and column of this probability in the body of a z table. The one decimal place z value for this probability is in the first column of this row. The second decimal place is directly above in the first row of the table.

B. The range is then found using this expression.　$\mu \pm z\sigma$

Partial z Table			
z	0.00	0.01	0.02
0.5	0.1915	0.1950	0.1985
1.0	0.3413	0.3438	0.3461
1.5	0.4332	0.4345	0.4357
2.0	0.4772	0.4778	0.4783
2.5	0.4938	0.4940	0.4941

C. Monthly sales at Linda's stores are normally distributed with a mean of $55,000 and a standard deviation of $15,000.

1. Using symmetrical limits around the mean, 95.44% of her monthly sales are between x_1 and x_2.

Given:

$\mu = \$55,000$

$\sigma = \$15,000$

$\frac{.9544}{2} = .4772 \rightarrow Z = 2$

$\mu \pm z\sigma$

$\$55,000 \pm 2(\$15,000)$

Range is $25,000 to $85,000.
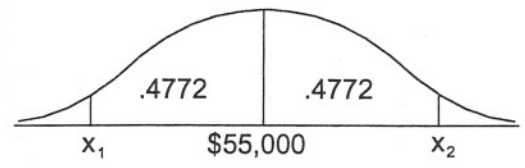
2. Find the first and third quartiles.

From page ST 3, $.25 \rightarrow z = .67$

$\mu \pm z\sigma$

$\$55,000 \pm .67(\$15,000)$

$\$55,000 \pm \$10,050$

Range is $44,950 to $65,050.

3. Find the top decile.

$50\% - 10\% = 40\% \rightarrow z = 1.28$

$\mu \pm z\sigma$

$\$55,000 + 1.28(\$15,000)$

$\$55,000 + \$19,200$

Sales must be above $74,200.

4. Find the second decile from the bottom.

a. The lower limit of x is associated with 40% and z for 40% is 1.28.

$\mu \pm z\sigma$

$\$55,000 - 1.28(\$15,000)$

$\$55,000 - \$19,200$

Lower limit is $35,800.

b. The upper limit of x is associated with 30% and z for 30% is .84.

$\mu \pm z\sigma$

$\$55,000 - .84(\$15,000)$

$\$55,000 - \$12,600$

Upper limit is $42,400.

The second decile has sales between $35,800 and $42,400.