

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

A. A z table shows the probability (area under curve) associated with a number of standard deviations (z) from the mean. Z standard deviations carried to 1 decimal place are shown in the first column of the table. Probability for a z is in the second column. Carrying z to 2 decimal places requires using other table columns.

B. $Z = \frac{x - \mu}{\sigma}$

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

See Table 3, page ST 3, for a complete z table

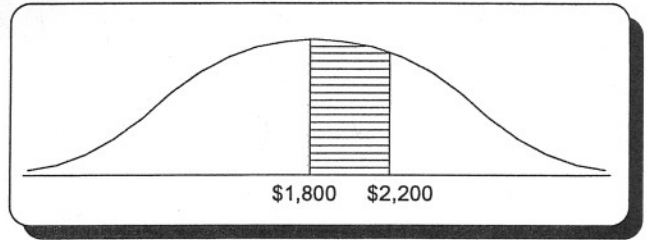
C. Continuing the page 58 example. What is the probability of store 1 having sales between \$1,800 and \$2,200? Calculate z and determine the probability using a z table.

Given: $\mu = \$1,800$ and $\sigma = \$400$

$$Z = \frac{x - \mu}{\sigma}$$

$$= \frac{\$2,200 - \$1,800}{\$400} = \frac{\$400}{\$400} = 1 \rightarrow .3413$$

34.13% are between \$1,800 and \$2,200



D. What is the probability of store 1 having sales between \$1,200 and \$2,004?

$$Z = \frac{x - \mu}{\sigma}$$

$$= \frac{\$1,200 - \$1,800}{\$400}$$

$$= \frac{-\$600}{\$400}$$

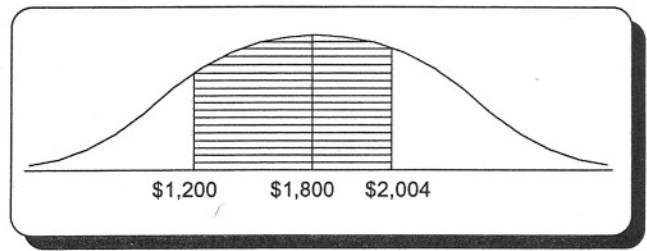
$$= -1.5 \rightarrow .4332$$

$$Z = \frac{x - \mu}{\sigma}$$

$$= \frac{\$2,004 - \$1,800}{\$400}$$

$$= \frac{\$204}{\$400}$$

$$= .51 \rightarrow .1950$$



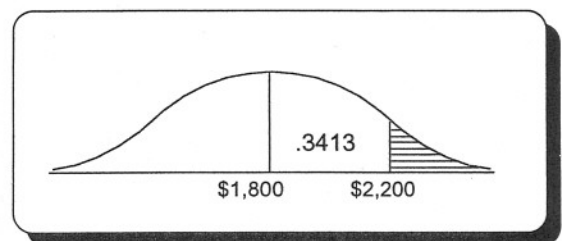
Note: Because a normal curve is symmetrical around the mean, z values below the mean are negative and represent the same probability as their positive counterparts.

43.32% are between \$1,200 and \$1,800
 19.50% are between \$1,800 and \$2,004
 62.82% are between \$1,200 and \$2,004

E. What is the probability of store 1 having sales over \$2,200?

- From question C, we know that 34.13% are between \$1,800 and \$2,200 (1σ).
- 50% are greater than \$1,800. Therefore,

15.87% or (50% - 34.13%) are greater than \$2,200.



F. What is the probability of store 1 having sales between \$2,004 and \$2,200?

- From question C, we know 34.13% are between \$1,800 and \$2,200.
- From question D, we know 19.5% are between \$1,800 and \$2,004. Therefore,

14.63% (34.13% - 19.50%) are between \$2,004 and \$2,200.

