$EBM = (1.96)\left(\frac{3}{\sqrt{36}}\right) = 0.98$

$\overline{x} - EBM = 68 - 0.98 = 67.02$

$\overline{x} + EBM = 68 + 0.98 = 68.98$

Notice that the *EBM* is larger for a 95% confidence level in the original problem.

We estimate with 95% confidence that the true population mean for all statistics exam scores is between 67.02 and 68.98.

Explanation of 95% Confidence Level: Ninety-five percent of all confidence intervals constructed in this way contain the true value of the population mean statistics exam score.

Comparing the results: The 90% confidence interval is (67.18, 68.82). The 95% confidence interval is (67.02, 68.98). The 95% confidence interval is wider. If you look at the graphs, because the area 0.95 is larger than the area 0.90, it makes sense that the 95% confidence interval is wider. To be more confident that the confidence interval actually does contain the true value of the population mean for all statistics exam scores, the confidence interval necessarily needs to be wider.

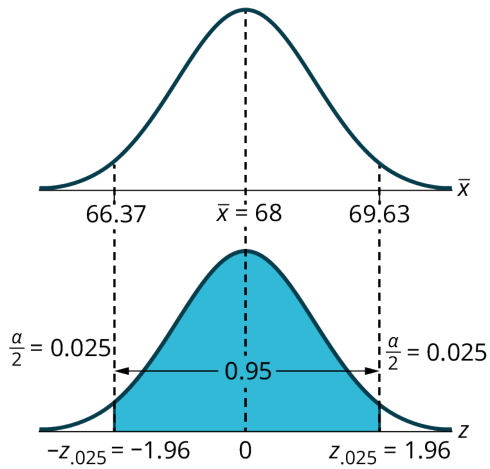

Figure 8.5

Summary: Effect of Changing the Confidence Level

- Increasing the confidence level increases the error bound, making the confidence interval wider.
- Decreasing the confidence level decreases the error bound, making the confidence interval narrower.

TRY IT 8.4

Refer back to the pizza-delivery Try It exercise. The population standard deviation is six minutes and the sample mean deliver time is 36 minutes. Use a sample size of 20. Find a 95% confidence interval estimate for the true mean pizza delivery time.

EXAMPLE 8.5

Suppose we change the original problem in Example 8.2 to see what happens to the error bound if the sample size is changed.

Problem

Leave everything the same except the sample size. Use the original 90% confidence level. What happens to the error bound and the confidence interval if we increase the sample size and use n = 100 instead of n = 36? What happens if we