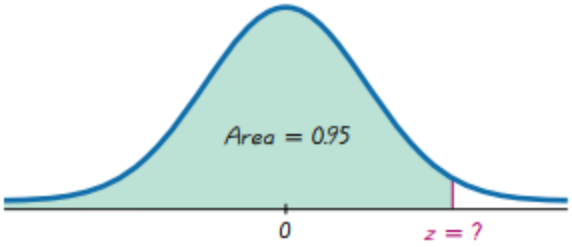


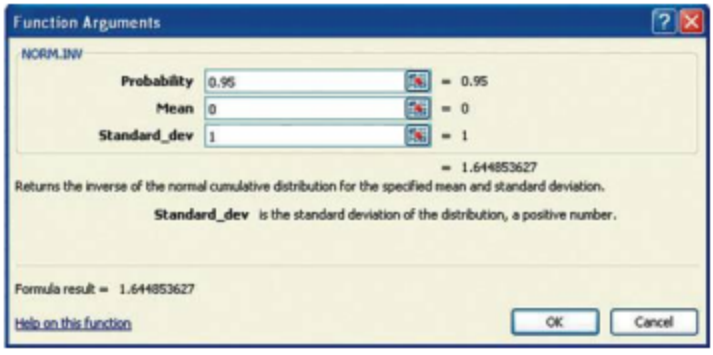
Figure 6-9 Finding the 95th Percentile

Solution

Figure 6-9 shows the z score that is the 95th percentile, with 95% of the area (or 0.95) below it. We could find the z score using technology. The accompanying Excel display shows that the z score with an area of 0.95 to its left is $z = 1.644853627$, or 1.645 when rounded.

If using Table A-2, search for the area of 0.95 *in the body* of the table and then find the corresponding z score. In Table A-2 we find the areas of 0.9495 and 0.9505, but there's an asterisk with a special note indicating that 0.9500 corresponds to a z score of 1.645. We can now conclude that the z score in Figure 6-9 is 1.645, so the 95th percentile is $z = 1.645$.

EXCEL



Interpretation

For bone density test scores, 95% of the scores are less than or equal to 1.645, and 5% of them are greater than or equal to 1.645.

Special Cases In the solution to Example 6, Table A-2 led to a z score of 1.645, which is midway between 1.64 and 1.65. When using Table A-2, we can usually avoid interpolation by simply selecting the closest value. The accompanying table lists special cases that are often used in a wide variety of applications. (For one of those special cases, the value of $z = 2.576$ gives an area slightly closer to the area of 0.9950, but $z = 2.575$ has the advantage of being the value midway between $z = 2.57$ and $z = 2.58$.) Except in these special cases, we can usually select the closest value in the table. (If a desired value is midway between two table values, select the larger value.) For z scores above 3.49, we can use 0.9999 as an approximation of the cumulative area from the left; for z scores below -3.49, we can use 0.0001 as an approximation of the cumulative area from the left.

Table A-2 Special Cases Table

z Score	Cumulative Area from the Left
1.645	0.9500
−1.645	0.0500
2.575	0.9950
−2.575	0.0050
Above 3.49	0.9999
Below −3.49	0.0001