population of z scores is normally distributed with a mean of 0 and a standard deviation of 1, so these test results meet the requirements of a standard normal distribution; Figure 6-4 is a graph of these test results.

A randomly selected adult undergoes a bone density test. Find the probability that the result is a reading less than 1.27.

Solution

We need to find the area in Figure 6-5 below $z = 1.27$. The *area* below $z = 1.27$ is equal to the *probability* of randomly selecting a person with a bone density test result that is less than 1.27. If using technology, see the instructions included at the end of this section. If using Table A-2, begin with the z score of 1.27 by locating 1.2 in the left column; next find the value in the adjoining row of probabilities that is directly below 0.07, as shown in the accompanying excerpt. Table A-2 shows that there is an area of 0.8980 corresponding to $z = 1.27$. We want the area *below* 1.27, and Table A-2 gives the cumulative area from the left, so the desired area is 0.8980. Because we have a correspondence between area and probability, we know that the probability of a z score below 1.27 is 0.8980.

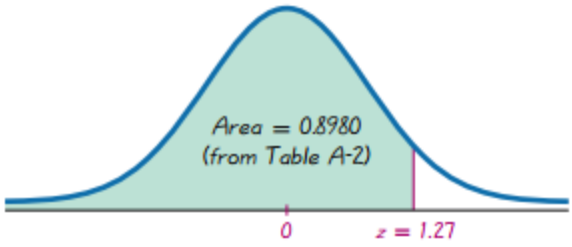

Figure 6-5
Finding Area below z = 1.27

TABLE A-2 (*continued*) Cumulative Area from the LEFT

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319

Interpretation

The *probability* that a randomly selected person has a bone density test result below 1.27 is 0.8980, as shown as the shaded region in Figure 6-5. Another way to interpret this result is to conclude that 89.80% of people have bone density levels below 1.27.