Test 2B

Part 1

1. **d** The distribution is clearly symmetric, but the shape is non-Normal.

2. **c** Whenever a distribution is symmetric, then mean and median are equal.

3. **c** By the 68-95-99.7 rule, 68% of the scores are within 1 standard deviation from the mean. The area from 16.0 to 16.1 is exactly half of this area (just the half below the mean).

4. **b** 100 – 68 = 34% of the area is more than 1 standard deviation from the mean, and half of that is below 1 standard deviation, or below 16 oz.

5. **d** The rightmost points on this plot would have to be farther to the left—lower—in order for this Normal probability plot to be straight. Hence these values are closer to the mean than they would be in a Normal distribution, and the distribution is skewed right.

6. **a** Statement I is true for all density curves, and statement II is true for all symmetric distributions. 68% of the scores (not 50%) are in the interval $\mu-\sigma$ to $\mu+\sigma$.

7. **a** Percentile of $z = 1.25$ is .8944, so proportion above 1.25 is 1 – .8944 = .1056.

8. **c** Using the graph, cumulative relative frequency for 2.15 is approximately 0.55, so 1 – 0.55 = 0.45 of the time were longer than 2.15.

9. **d** The distribution z-scores is a linear transformation, so it won't change the shape of the distribution. Whenever a distribution is standardized with z scores, the mean becomes 0 and the standard deviation becomes 1.

10. **b** $z_{10} = \dfrac{10-9}{2.5} = 0.40$, which is the 65.54th percentile of the Standard Normal curve, so about 34.5% of the times are above that value.

Part 2

11. The z-score for a four-year-old car with 40 thousand miles is $\dfrac{40-56.68}{17.82} = -0.94$. I The z-score for a three-year-old car with 30 thousand miles is $\dfrac{30-33.33}{12.70} = -0.26$. This means that the three year old car had been driven more miles, relative to other cars the same age. (The percentiles are about 17.5% for the four year old car with 40 thousand miles and 39.7% for the three year old car with 30 thousand miles.) **12.** $z = \dfrac{42-56.68}{17.82} = -0.82$, which is the 20.61 percentile of the Standard Normal curve. About 80% of 30 cars—or 24 cars—have been driven more than 42 thousand miles. **13.** z for 60th percentile = 0.25. 0.25(17.82) + 56.68 = 61.1 thousand miles. **14.** Mean = 0.01(156 – 2) = 1.54 meters; standard deviation = 0.01(5) = 0.05 meters. **15.** z for 33rd percentile is –0.44, and 99.2 + (–0.44)(10.5) = 94.58 ≈ 95 points per game. **16.** $z = \dfrac{101.7-99.2}{10.5} = 0.24$, which has a proportion of 1 – 0.5948 = .4052 of the scores above it. **17.** The width of this region is 2 minutes, which is 2/5 of the range of values. Hence the proportion is 0.40. See figure below.