STAT 301T HW3 ANSWERS

3.1. Sketches will vary. Use them to confirm that students understand the meaning of (a) symmetric and (b) skewed to the left.

3.4. (a) Mean is C, median is B (the right skew pulls the mean to the right). (b) Mean B, median B (this distribution is symmetric). (c) Mean A, median B (the left skew pulls the mean to the left).

3.8. Eleanor’s standardized score is \( z = \frac{680 - 518}{114} = 1.42 \), and Gerald’s standardized score is \( z = \frac{27 - 20.7}{5.0} = 1.26 \). Eleanor’s score is higher.

3.10. (a) 0.9978. (b) 0.0022. (c) 0.9515. (d) 0.9515 - 0.0022 = 0.9493.

3.12. With the new mean and standard deviation, the inequalities \( x > 0.40 \) and \( 0.40 < x < 0.50 \) correspond (respectively) to \( z > \frac{0.40 - 0.41}{0.02} = -0.5 \) and \( -0.5 < z < \frac{0.50 - 0.41}{0.02} = 4.5 \). For the first of these, Table A gives proportion 1 - 0.3085 = 0.6915; the second is essentially 0.6915 as well.

3.13. (a) Search Table A for 0.25; \( z = -0.67 \) (software gives -0.6745).
(b) Search Table A for 0.60; \( z = 0.25 \) (software: 0.2533).

3.14. (a) IQs below about 90: Searching Table A for 0.25 leads to \( z < -0.67 \), which corresponds to \( x < 100 - 0.67(15) = 90 \). (Using the software value \( z < -0.6745 \) gives \( x < 89.9 \).) (b) About 125 or more: Searching Table A for 0.95 leads to \( z > 1.64 \) or 1.65; software gives 1.6449. For any value of \( z^* \) between 1.64 and 1.65, we find that \( 100 + (z^*)(15) \) is between 124.6 and 124.75.

3.42. From Table A, we estimate that the quartiles of a Normal distribution are \( \pm 0.675 \) standard deviations from the mean, so for ACT scores they are \( 20.9 \pm 0.675 \times 4.8 = 17.7 \) to 24.1. (Software gives \( \pm 0.6745 \), which yields the same ACT scores after rounding.)