

Solution for Homework 3

- 3.2 (a) The density curve forms a 1×1 square, which has area 1.
(b) 20%. The region is a rectangle with height 1 and base width $1 - 0.8 = 0.2$.
(c) 60%. The region is a rectangle with height 1 and base width 0.6.
(d) 50%. The region is a rectangle with height 1 and base width $0.75 - 0.25 = 0.5$.

3.3 Mean $\mu = 0.5$, which is the obvious balance point of the square.

The median is also 0.5 because the distribution is symmetric so that the median equals the mean, and because half of the area lies to the left and half to the right of 0.5.

- 3.4 (a) Mean is C, median is B. The right skew pulls the mean to the right and A is just the maximum.
(b) Mean is A, median is A. The curve is symmetric.
(c) Mean is A, median is B. The right skew pulls the mean to the left and C is just the maximum.

3.15 (a) 50%.

The Normal curve is symmetric. Therefore, the mean and the median are both equal to 100.

Since the median is the equal area point, 50% of people have WAIS scores above 100, which is the median.

(b) 0.15%.

By the 68-95-99.7 rule, 99.7% of the people have WAIS scores between $100 - 3 \times 15$ and $100 + 3 \times 15$. Namely, 99.7% of the people have WAIS scores between 55 and 145. Hence, 0.3% of the people have WAIS scores below 55 or above 145. Since the Normal curve is symmetric, the percentage of the people having WAIS scores below 55 should equal to the people having WAIS scores above 145. Thus, the percentage of the people having WAIS scores above 145 is $0.3\% / 2 = 0.15\%$.

(c) 16%.

By the 68-95-99.7 rule, 68% of the people have WAIS scores between $100 - 15$ and $100 + 15$.

Namely, 99.7% of the people have WAIS scores between 85 and 115. Hence, 32% of the people have WAIS scores below 85 or above 115. Since the Normal curve is symmetric, the percentage of the people having WAIS scores below 85 should equal to the people having WAIS scores above 115. Thus, the percentage of the people having WAIS scores below 85 is $32\% / 2 = 16\%$.

3.16 2.5%.

By the 68-95-99.7 rule, 95% of the people have WAIS scores between $100 - 15 \times 2$ and $100 + 15 \times 2$.

Namely, 95% of the people have WAIS scores between 70 and 130. Hence, 5% of the people have WAIS scores below 70 or above 130. Since the Normal curve is symmetric, the percentage of the people having WAIS scores below 70 should equal to the people having WAIS scores above 130. Thus, the percentage of the retarded people (having WAIS scores below 70) is $5\% / 2 = 2.5\%$.

3.17 2.5%.

By the 68-95-99.7 rule, 95% of the people have WAIS scores between $100 - 15 \times 2$ and $100 + 15 \times 2$.

Namely, 95% of the people have WAIS scores between 70 and 130. Hence, 5% of the people have WAIS scores below 70 or above 130. Since the Normal curve is symmetric, the percentage of the people having WAIS scores below 70 should equal to the people having WAIS scores above 130. Thus, the percentage of the people qualifying for membership (having WAIS scores above 130) is $5\% / 2 = 2.5\%$.