

Normal Curve Practice: Chapter 5

1. The following list of student ages has an average of 22 and an SD of 4:
 $\{18, 18, 19, 19, 20, 22, 22, 25, 26, 31\}$.
 - (a)
 - i. Use the normal approximation to estimate the number of scores within 0.8 SDs of the average.
 - ii. How many of the ages really were within 0.8 SDs of the average age?
 - (b)
 - i. Use the normal approximation to estimate the number of scores within 1.25 SDs of the average.
 - ii. How many of the ages really were within 1.25 SDs of the average age?
2. Among freshmen at a certain university, scores on the Math SAT followed the normal curve, with an average of 530 and an SD of 90. Fill in the blanks in parts (a) and (b) and explain briefly. In parts (c) through (e) find each percentage and give some details of the calculations.
 - (a) A student who scored 485 on the Math SAT was at the _____ percentile of the score distribution.
 - (b) To be at the 58th percentile of the distribution, a student needed a score of about _____ on the Math SAT.
 - (c) Estimate the percentage of freshmen scoring between 630 and 670.
 - (d) Estimate the percentage of freshmen who scored over 719.
 - (e) Estimate the percentage of freshmen who scored below 341.
 - (f) Estimate the percentage of freshmen who scored below 485.
3. The heights of 1,000,000 people were recorded and tabulated. They did not necessarily follow the normal curve. How many people had a height between the 38th percentile height and the 75th percentile height; and how many of the 1,000,000 heights fell in the interquartile range?

Answers

1. (a)
 - i. About 6
 - ii. Six of them (the two 19's, the 20, the two 22's, and the 25)(b)
 - i. About 8
 - ii. Nine of them (all but the 31)
2. (a) the 31st percentile, because the standard units are -0.5 and the area below -0.5 on the normal curve is $\frac{100\% - 38.29\%}{2} \approx 31\%$.
(b) 548, because the 58th percentile of the normal curve has 8% of the area between 0 and z , so we double that area and look up 16% to get $z = +0.20$. Then 0.2 SDs above the average will be the answer: $0.2 \times 90 + 530 = 548$.
(c) about 7 1/2%, because the standard units are about 1.10 and 1.55.
(d) about 1.8%, since 719 in standard units is $+2.1$, and the area above $z = +2.1$ on the normal curve is $\frac{100\% - 96.43\%}{2}$.
(e) same as part (d): 1.8%. In standard units 341 is -2.1 . Then use symmetry to show that the area below -2.1 must be the same as the area above $+2.1$.
(f) 31%; just use the result of part (a). Since 485 was at the 31st percentile, by definition the percentage below it is 31%.
3. 370,000; 500,000