AP Statistics

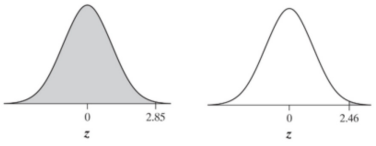
Chapter 2:
Modeling Distributions of Data

Day 5

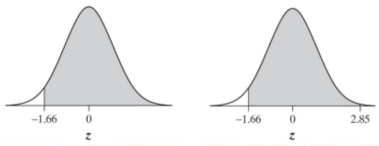
HW: p. 132-133, #53, 55, 57, 59

p. 131-132, #47-52

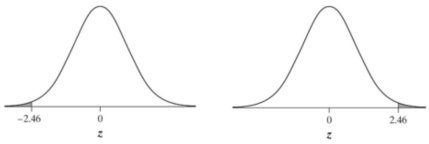
47.
(a) 0.9978. The graph is shown below (left). (b) 1 − 0.9978 = 0.0022. The graph is shown below (right).



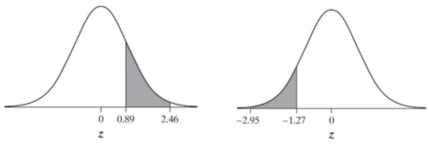
(c) 1 – 0.0485 = 0.9515. The graph is show below (left). (d) 0.9978 – 0.0485 = 0.9493. The graph is show below (right).



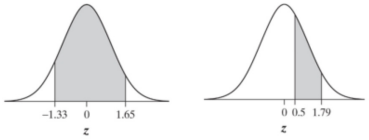
48.
(a) 0.0069. The graph is show below (left). (b) 1 − 0.9931 = 0.0069. The graph is shown below (right).



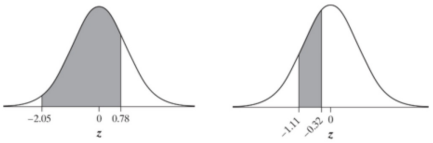
(c) 0.9931 − 0.8133 = 0.1798. The graph is shown below (left). (d) 0.1020 − 0.0016 = 0.1004. The graph is shown below (right).



49.
(a) 0.9505 – 0.0918 = 0.8587. The graph is shown below (left). (b) 0.9633 – 0.6915 = 0.2718. The graph is shown below (right).



50.
(a) 0.7823 – 0.0202 = 0.7621. The graph is shown below (left). (b) 0.3745 – 0.1335 = 0.241. The graph is shown below (right).

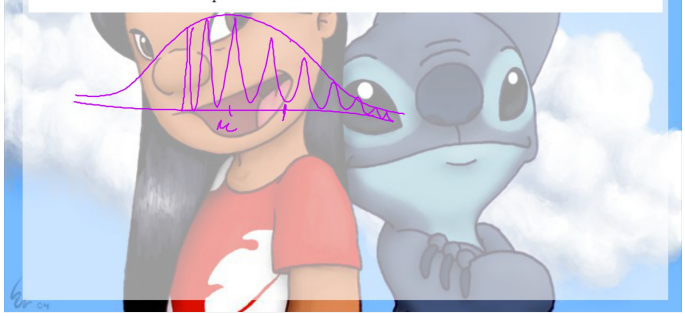


51.
(a) The value that is closest to 0.1000 in Table A is 0.1003. This corresponds to a value of −1.28 for z.

(b) The point where 34% of observations are greater is also the $10^{th} - 34 = 66^{th}$ percentile. The value that is closest to 0.6600 in Table A is 0.6591 which corresponds to a z-score of 0.41.

52.
(a) The value that is closest to 0.6300 in Table A is 0.6293 which corresponds to a z-value of 0.33.

(b) If 75% of values are greater than z, then 25% are lower. The value that is closest to 0.2500 in Table A is 0.2514 which corresponds to a z-score of -0.67.



Example

A particular college entrance exam has two parts: math and verbal. The distribution of math scores is normal with a mean of 500 and a standard deviation of 100. An advanced summer math program requires a score of at least 625 to participate. What proportion of students is eligible to participate in the program?

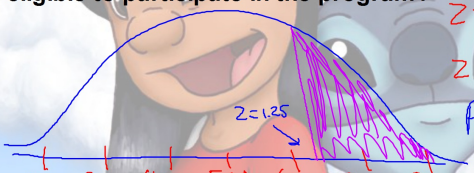
$Z = \frac{625-500}{100}$

$Z = 1.25$

$P(Z > 1.25) =$

$1 - .8944 =$

.1056



About 10.56% of college students earn scores that are at least a 625.

Example

American adult females have heights that are normally distributed with a mean of 161 cm and a standard deviation of 6.5 cm. A company is seeking women of a certain height to operate a particular vehicle. Women should not be shorter than 146 cm (because they will not be able to reach the controls) or taller than 173 cm (because they hit their heads on the roof). What percent of women could hold this job?

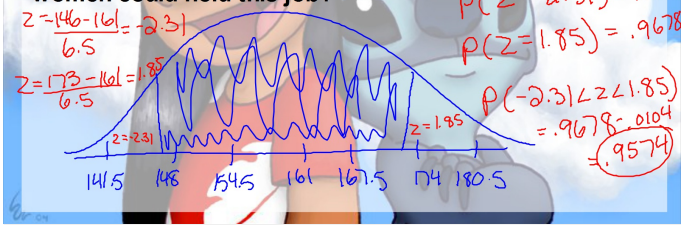
$Z = \frac{146-161}{6.5} = -2.31$

$Z = \frac{173-161}{6.5} = 1.85$

$P(Z = -2.31) = .0104$

$P(Z = 1.85) = .9678$

$P(-2.31 < Z < 1.85) = .9678 - .0104 = .9574$



Example

High levels of cholesterol in the blood increase the risk of heart disease. For 14-year old boys, the distribution of blood cholesterol is approximately normal with mean μ = 170 milligrams of cholesterol per deciliter of blood (mg/dl) and standard deviation σ = 30 mg/dl. What is the first quartile of the distribution of blood cholesterol?

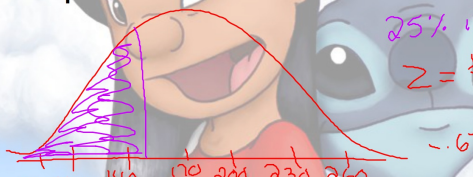
25% is $Z = -.67$

$Z = \frac{x-\mu}{\sigma}$

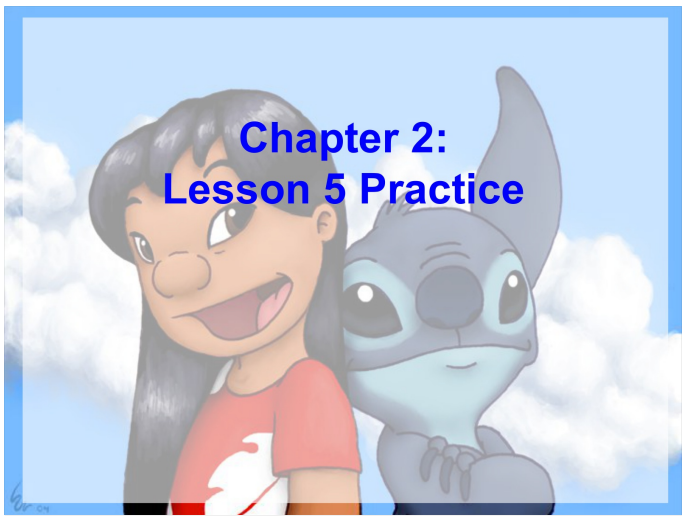
$-.67 = \frac{x-170}{30}$

$-20.1 = x - 170$

$149.9 = x$



The 25% percentile will be a Cholesterol level of 149.9


Chapter 2:
Lesson 5 Practice