



Problem 1

Topics: continuous random variables, Normal distribution, empirical rule

Given an approximately normal distribution with a mean of 175 and a standard deviation of 37.

1. Draw a normal curve and label 1, 2, and 3 standard deviations on both sides on the mean.
2. What percent of values are within the interval (138, 212)? **68%**
3. What percent of values are within the interval (64, 286)? **99.7%**

Problem 2

Topics: continuous random variables, Normal distribution, empirical rule

It is known that when a specific type of radish is grown in a certain manner without fertilizer the weights of the radishes produced are normally distributed with a mean of 40g and a standard deviation of 10g.

Determine the proportion of radishes grown:

4. Without fertilizer with weights less than 50 grams. **.84**
5. Without fertilizer with weights between 20 and 60 grams. **.475**
6. Without fertilizer that will have weights greater than or equal to 60 grams. **.025**

Problem 3:

Topics: continuous random variables, Normal distribution, empirical rule

7. Which of the following would indicate that a dataset is **not** bell-shaped³?
 - a. The range is equal to 5 standard deviations.
 - b. The range is larger than the interquartile range.
 - c. **The mean is much smaller than the median.**
 - d. There are no outliers.
 - e. None of the above

Problem 4

8. What is the z-score of $x = 5$ if it is 1.8 standard deviations below the mean?

Answer 1.8

Problem 5:

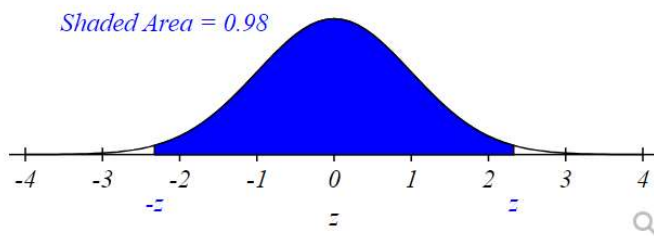
Topics: continuous random variable, standard normal distribution, probability, use of the Z table

¹ Math-UOttawa ² UVermont ³ Utts ⁴ OpenIntro

What percent of a standard normal distribution $N(\mu = 0, \sigma = 1)$ is found in each region⁴? Be sure to draw a graph

- 9. $Z < 1.35$ Answer: 91.15%
- 10. $Z > 1.48$ Answer: 6.94%
- 11. $0.4 < Z < 1.5$ Answer 27.78%
- 12. $Z < -20.92$ or $Z > 20.97$ Answer 2x.1151

Using the standard normal distribution, find the two z-scores that that form the middle shaded region. The shaded region is symmetric about $z = 0$. Round your z-scores to two decimal places.



Negative z-score = ♂

Positive z-score = ♂

Problem 6:

Topics: histogram, Normal approximation to data, Normal probability plot, Q-Q plot

13. Can we approximate poker winnings by a normal distribution? We consider the poker winnings of an individual over 50 days. A histogram and normal probability plot of these data are shown in the following figure⁴:

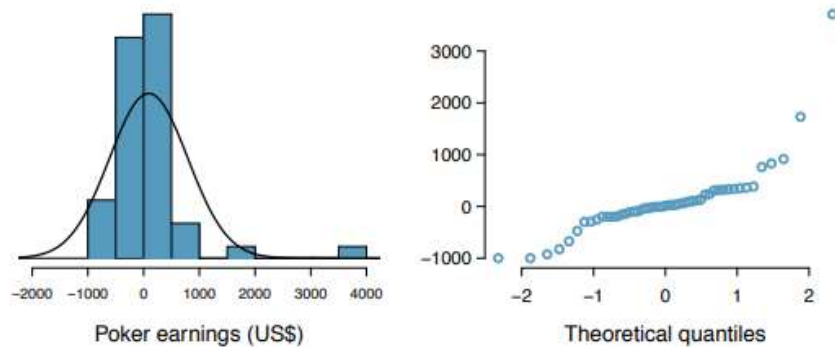


Figure 3.13: A histogram of poker data with the best fitting normal plot and a normal probability plot.

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Answer: No, both the histogram and the QQ plot show that the distribution is skewed to the right.

Problem 7

14. Overweight baggage. Suppose weights of the checked baggage of airline passengers follow a nearly normal distribution with mean 45 pounds and standard deviation 3.2 pounds. Most airlines charge a fee for baggage that weigh in excess of 50 pounds⁴. Determine what percent of airline passengers incur this` fee.

Answer: 0.0594

Problem 8

The cholesterol content of large chicken eggs is normally distributed with a mean of 200 milligrams and standard deviation 15 milligrams.

15. What is the probability that the mean cholesterol content of a random egg is less than 205 milligrams?

16. In sixty-seven percent of the eggs, the cholesterol content is less than a certain value “C”. Find the value of “C”.

- a) 0.33
- b) 206.6
- c) 210
- d) 0.44
- e) 193.4

Problem 9

Topics: Normal distribution, parameters of the normal distribution, z-score, quartiles, use of the Z table

Auto insurance premiums. Suppose a newspaper article states that the distribution of auto insurance premiums for residents of California is approximately normal with a mean of \$1,650. The article also states that 25% of California residents pay more than \$1,800⁴.

17. What is the z-score that corresponds to the top 25% of the standard normal distribution?

Answer: .67

18. What is the mean insurance cost? What is the cutoff for the 75th percentile?

Answer: \$1,800

19. Identify the standard deviation of insurance premiums in LA.

Answer: \$223.88

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