6.E: Probability (Exercises)

1. In your own words, what is probability?

Answer:

Your answer should include information about an event happening under certain conditions given certain criteria. You could also discuss the relation between probability and the area under the curve or the proportion of the area in a chart.

2. There is a bag with 5 red blocks, 2 yellow blocks, and 4 blue blocks. If you reach in and grab one block without looking, what is the probability it is red?
3. Under a normal distribution, which of the following is more likely? (Note: this question can be answered without any calculations if you draw out the distributions and shade properly)
   - Getting a z-score greater than $z = 2.75$
   - Getting a z-score less than $z = -1.50$

Answer:

Getting a z-score less than $z = -1.50$ is more likely. $z = 2.75$ is farther out into the right tail than $z = -1.50$ is into the left tail, therefore there are fewer more extreme scores beyond 2.75 than -1.50, regardless of the direction

4. The heights of women in the United States are normally distributed with a mean of 63.7 inches and a standard deviation of 2.7 inches. If you randomly select a woman in the United States, what is the probability that she will be between 65 and 67 inches tall?
5. The heights of men in the United States are normally distributed with a mean of 69.1 inches and a standard deviation of 2.9 inches. What proportion of men are taller than 6 feet (72 inches)?

Answer:

15.87% or 0.1587

6. You know you need to score at least 82 points on the final exam to pass your class. After the final, you find out that the average score on the exam was 78 with a standard deviation of 7. How likely is it that you pass the class?
7. What proportion of the area under the normal curve is greater than $z = 1.65$?

Answer:

4.95% or 0.0495

8. Find the z-score that bounds 25% of the lower tail of the distribution.
9. Find the z-score that bounds the top 9% of the distribution.

Answer:

$z = 1.34$ (the top 9% means 9% of the area is in the upper tail and 91% is in the body to the left; finding the value in the normal table closest to .9100 is .9099, which corresponds to $z = 1.34$)

10. In a distribution with a mean of 70 and standard deviation of 12, what proportion of scores are lower than 55?