
4.I RANDOM SAMPLING - SHOW ME THE MONEY!

INTRODUCTION

1. Name your favorite movie of all time.
2. Guess the average box office gross income in theaters for movies in 2018 (US theaters only).
3. Guess the title of the top-grossing movie of 2018.
4. Guess the maximum gross income (US box office sales) by a movie in 2018.

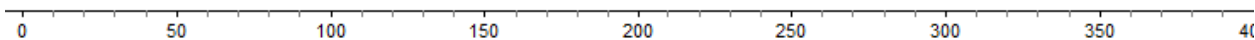
CHOOSE YOUR SAMPLE

5. Take a look at the list of the 200 top-grossing movies of 2018 and select a **sample** of 10 that you saw (or wanted to see) in theaters. For purposes of this activity, we will consider these 200 movies as a small **population**. Record the gross box office gross income for each movie.

6. Compute and record the **sample mean** box office gross income, \bar{x} .

$\bar{x} =$

7. Is your sample mean the same as the other sample means of the other students in your class?
8. The fact that different samples yield different statistics (in this case different sample means) is called **sampling variability**. As a class, create a dotplot of sample means on the board. Record this dotplot on the number line below, carefully labeling the axis.



9. Based on the previous dotplot, without any calculations, what do you suppose the **population mean** box office gross income, μ ?

$\mu =$

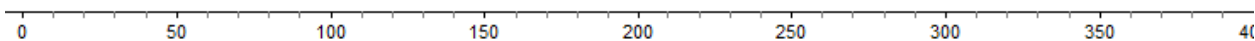
The method you used to choose a sample from the population is based on your experience and interest in movies. It turns out that this is not a particularly good way to sample if you wish to generate a sample that is representative of the population. Instead of using human experience, judgment, or interest to choose a sample, statisticians use chance to select a sample from a large population. A sample selected by a chance process is called a **random sample**.

RANDOM SAMPLING

10. Your instructor will give you instructions on how to use random chance to select 10 movies from the population of 200 movies. You will draw chips from a container, use a table of random digits, or use technology to generate 10 random numbers from 1-200. Find the corresponding ID numbers in the table and record the gross box office for each of these movies.
11. Compute and record the **sample mean** box office gross income, \bar{x} .

$$\bar{x} =$$

12. As a class, create a dotplot of sample means on the board. Record this dotplot on the number line below, carefully labeling the axis.



13. Based on the previous dotplot, without any calculations, what do you suppose the **population mean** box office gross income, μ ?

$$\mu =$$

14. Is your guess for the mean gross income from a random sample noticeably different from or about the same as your guess when you chose your own sample? If so, why do you think they are different? If not, why do you think they are about the same?

BIG IDEAS

15. The population mean gross income for all 200 movies is $\mu = \$57.13$ million. Go back to your dotplots and draw a vertical line at 57.13. Did the sample means (\bar{x}) do a good job of estimating the population mean for both types of sampling? What have you learned about the use of random sampling?