LESSON MAKER PRO

Normal Curve Snapshots

Estimate percentages with the Empirical Rule.

HIGH SCHOOL · MA.912.DP.2.3

MA.912.DP.2.3 "Estimate population percentages from data that has been fit to the normal distribution."

NAME _____ DATE _____

USE THE CURVE

For a normal model, about 68% of values are within 1 standard deviation of the mean, 95% are within 2, and 99.7% are within 3. The curve is symmetric, so split each side of the mean equally.

WORKED EXAMPLE

A normal model has mean 63 and standard deviation 7. Estimate the percentage from 63 to 70.

1. 70 is 1 standard deviation above 63.
2. About 68% is within 1 standard deviation on both sides.
3. Half of 68% is 34%.

Answer: About 34%.

PRACTICE 5 problems

1 A normal model has mean 80 and standard deviation 4. Estimate the percentage above 84.

ANSWER _____

2 A normal model has mean 30 and standard deviation 6. Estimate the percentage from 36 to 42.

ANSWER _____

3 A normal model has mean 150 and standard deviation 12. Estimate the percentage below 126.

ANSWER _____

4 A normal model has mean 18 and standard deviation 2. Estimate the percentage from 14 to 22.

ANSWER _____

5 A normal model has mean 200 and standard deviation 25. Estimate the percentage below 200.

ANSWER _____

APPLY IT Show your work

1 Reaction times for players on an esports team are modeled normally with a mean of 280 milliseconds and a standard deviation of 20 milliseconds. Estimate the percentage of reaction times faster than 260 milliseconds.

WORK SPACE

ANSWER _____

2 The battery life of loaner laptops is modeled normally with a mean of 9 hours and a standard deviation of 1 hour. Estimate the percentage that last from 8 to 10 hours.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The middle 95% of a normal model runs from 46 to 82. Find the mean and standard deviation. Then estimate the percentage above 82.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A normal model has mean 80 and standard deviation 4. Estimate the percentage above 84.	**About 16%.**
2	A normal model has mean 30 and standard deviation 6. Estimate the percentage from 36 to 42.	**About 13.5%.**
3	A normal model has mean 150 and standard deviation 12. Estimate the percentage below 126.	**About 2.5%.**
4	A normal model has mean 18 and standard deviation 2. Estimate the percentage from 14 to 22.	**About 95%.**
5	A normal model has mean 200 and standard deviation 25. Estimate the percentage below 200.	**About 50%.**

PART 2 · APPLY IT

1. **About 16%.** 260 is 1 standard deviation below the mean. About 16% of values lie below 1 standard deviation below the mean.
2. **About 68%.** The interval is 1 standard deviation below to 1 standard deviation above the mean. About 68% of values are in that interval.

CHALLENGE

Mean: 64. Standard deviation: 9. Above 82: about 2.5%.

Accept percentages marked as approximate. Accept 16% or 15.9% when students use a normal table instead of the Empirical Rule.