LESSON MAKER PRO

Normal Curve Chances

Estimate percentages using a small area table.

HIGH SCHOOL · A2S.DSP.C.25.b

A2S.DSP.C.25.b "Estimate areas under a normal curve to solve problems in context, using calculators, spreadsheets, and tables as appropriate."

NAME _____ DATE _____

FROM DISTANCE TO AREA

For a normal distribution, find how many standard deviations a value is from the mean: distance = |value - mean| / standard deviation. Half the curve is on each side of the mean, so use the table to add or subtract areas.

WORKED EXAMPLE

The mean is 72 and the standard deviation is 8. Estimate the percent of values between 72 and 80.

NORMAL CURVE AREA TABLE

Distance from mean	Area from mean
1 SD	34%
2 SD	47.5%
3 SD	49.85%

1. Distance = (80 - 72) / 8 = 1 standard deviation.
2. The table gives 34% from the mean to 1 standard deviation above it.

Answer: 34%

PRACTICE 4 problems

1 Use the table above. The mean is 100 and the standard deviation is 10. Estimate the percent above 110.

ANSWER _____

2 The mean is 60 and the standard deviation is 5. Estimate the percent below 50.

ANSWER _____

3 The mean is 30 and the standard deviation is 4. Estimate the percent between 26 and 38.

ANSWER _____

4 The mean is 200 and the standard deviation is 20. Estimate the percent between 160 and 240.

ANSWER _____

APPLY IT Show your work

1 Concert security wait times are normally distributed, with a mean of 25 minutes and a standard deviation of 5 minutes. Estimate the percent of waits under 35 minutes.

WORK SPACE

ANSWER _____

2 Scores in a video game are normally distributed, with a mean of 400 points and a standard deviation of 50 points. Estimate the percent of scores above 550 points.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Daily listening times are normally distributed, with a mean of 45 minutes and a standard deviation of 10 minutes. What listening time marks the start of the top 2.5%? Explain your reasoning.

WORK SPACE AND ANSWER

ANSWER KEY

Normal Curve Chances

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the table above. The mean is 100 and the standard deviation is 10. Estimate the percent above 110.	**16%**
2	The mean is 60 and the standard deviation is 5. Estimate the percent below 50.	**2.5%**
3	The mean is 30 and the standard deviation is 4. Estimate the percent between 26 and 38.	**81.5%**
4	The mean is 200 and the standard deviation is 20. Estimate the percent between 160 and 240.	**95%**

PART 2 · APPLY IT

1. **97.5%** 35 minutes is 2 standard deviations above the mean. Add 50% and 47.5%.
2. **0.15%** 550 points is 3 standard deviations above the mean. Subtract 49.85% from 50%.

CHALLENGE

65 minutes. The area above 2 standard deviations from the mean is 50% - 47.5% = 2.5%, and 45 + 2(10) = 65.

Answers are estimates based on the provided table. Accept equivalent decimal probabilities, such as 0.16 for 16%.