LESSON MAKER PRO

Normal Curve Estimates

Use a table to estimate percentages and check when a normal model fits.

HIGH SCHOOL · S.DA.2.1

S.DA.2.1 "Use calculators, computers, or tables to estimate areas under the normal curve. Recognize that there are data sets for which such a procedure is not appropriate."

NAME _____ DATE _____

AREA AS A PERCENTAGE

For normal data, find z = (value - mean)/standard deviation. The table gives the area to the left of z. Subtract two left areas to find an interval, or subtract a left area from 1 to find an upper tail. Check the data's shape before using a normal model.

WORKED EXAMPLE

A normal data set has mean 50 and standard deviation 8. Use the table to estimate the percent of values between 42 and 66.

NORMAL CURVE AREA TO THE LEFT

z	Area
-2	0.0228
-1	0.1587
0	0.5000
1	0.8413
2	0.9772

1. For 42, z = (42 - 50)/8 = -1.
2. For 66, z = (66 - 50)/8 = 2.
3. Subtract the table areas: 0.9772 - 0.1587 = 0.8185.

Answer: About 81.85%.

PRACTICE 4 problems

1 Use the example table. Normal data have mean 100 and standard deviation 10. Estimate the percent below 90.

ANSWER _____

2 Use the example table. Normal data have mean 30 and standard deviation 5. Estimate the percent above 40.

ANSWER _____

3 Use the example table. Normal data have mean 200 and standard deviation 20. Estimate the percent between 180 and 220.

ANSWER _____

4 Use the example table. Normal data have mean 72 and standard deviation 6. Estimate the percent between 60 and 72.

ANSWER _____

APPLY IT Show your work

1 Game download times are approximately normal, with mean 18 minutes and standard deviation 3 minutes. Use the example table to estimate the percent of downloads that take between 15 and 24 minutes.

WORK SPACE

ANSWER _____

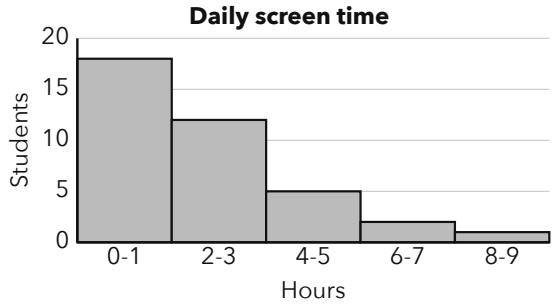
2 Checkout waits for a sneaker release are approximately normal, with mean 25 minutes and standard deviation 5 minutes. Use the example table to estimate the percent of waits longer than 35 minutes.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The histogram shows students' daily screen time. Should you use a normal curve to estimate percentages for this group? Explain using the shape of the data.



WORK SPACE AND ANSWER

ANSWER KEY

Normal Curve Estimates

HIGH SCHOOL · S.DA.2.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the example table. Normal data have mean 100 and standard deviation 10. Estimate the percent below 90.	**About 15.87%.**
2	Use the example table. Normal data have mean 30 and standard deviation 5. Estimate the percent above 40.	**About 2.28%.**
3	Use the example table. Normal data have mean 200 and standard deviation 20. Estimate the percent between 180 and 220.	**About 68.26%.**
4	Use the example table. Normal data have mean 72 and standard deviation 6. Estimate the percent between 60 and 72.	**About 47.72%.**

PART 2 · APPLY IT

1. **About 81.85%.** The endpoints have z-scores -1 and 2. Subtract the table areas: 0.9772 - 0.1587 = 0.8185.
2. **About 2.28%.** A wait of 35 minutes has z = 2. The area above it is 1 - 0.9772 = 0.0228.

CHALLENGE

No. The bars decrease toward higher screen times, so the data are skewed right rather than roughly symmetric and bell-shaped.

Percentages are estimates from the rounded table. Accept equivalent decimal proportions and explanations that identify the challenge data as strongly right-skewed.