LESSON MAKER PRO

Measure the Margin

Estimate area and account for rounded measurements.

HIGH SCHOOL · GDA.GM.B

GDA.GM.B "Constructing approximations of measurements with different tools, including technology, can support an understanding of measurement."

NAME _____ DATE _____

FROM READING TO RANGE

A length recorded to the nearest centimeter is within 0.5 cm of its reading. To estimate a rectangle's area, multiply its recorded sides. To bound its true area, multiply the lower side bounds, then the upper side bounds.

WORKED EXAMPLE

Both sides of a rectangular card were measured to the nearest centimeter. Estimate its area and bound its true area.

CARD MEASUREMENTS

Side	Reading
Length	7 cm
Width	9 cm

1. Estimated area: 7 * 9 = 63 cm^2.
2. Lower bound: 6.5 * 8.5 = 55.25 cm^2.
3. Upper bound: 7.5 * 9.5 = 71.25 cm^2.

Answer: About 63 cm^2; at least 55.25 cm^2 but less than 71.25 cm^2.

PRACTICE 4 problems

1 A ruler reads 12 cm to the nearest centimeter. Give the interval for the true length.

ANSWER _____

2 A caliper reads 4.2 cm to the nearest 0.1 cm. Give the interval for the true length.

ANSWER _____

3 A rectangular patch has recorded side lengths of 10 cm and 3 cm. Estimate its area.

ANSWER _____

4 Two strips read 18 cm and 2 cm, each to the nearest centimeter. Estimate their combined length and give its interval.

ANSWER _____

APPLY IT Show your work

1 A phone decal has the recorded dimensions shown. Both were rounded to the nearest centimeter. Estimate its area and bound its true area.

PHONE DECAL

Side	Reading
Length	16 cm
Width	5 cm

ANSWER _____

2 A miniature skate ramp has a triangular side panel. Its readings were rounded to the nearest centimeter. Using area = base * perpendicular height / 2, find the estimated area and an upper bound.

RAMP SIDE PANEL

Measurement	Reading
Base	14 cm
Perpendicular height	10 cm

ANSWER _____

CHALLENGE One step up

A rectangular laptop decal must have an area less than 75 cm^2. Its sides were measured to the nearest centimeter. Do the readings guarantee it meets the limit? Explain with an area bound.

LAPTOP DECAL

Side	Reading
Length	17 cm
Width	4 cm

WORK SPACE AND ANSWER

ANSWER KEY

Measure the Margin

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A ruler reads 12 cm to the nearest centimeter. Give the interval for the true length.	**At least 11.5 cm but less than 12.5 cm.**
2	A caliper reads 4.2 cm to the nearest 0.1 cm. Give the interval for the true length.	**At least 4.15 cm but less than 4.25 cm.**
3	A rectangular patch has recorded side lengths of 10 cm and 3 cm. Estimate its area.	**30 cm^2**
4	Two strips read 18 cm and 2 cm, each to the nearest centimeter. Estimate their combined length and give its interval.	**20 cm; at least 19 cm but less than 21 cm.**

PART 2 · APPLY IT

1. **About 80 cm^2; at least 69.75 cm^2 but less than 90.75 cm^2.** Multiply 16 * 5 for the estimate. The area bounds are 15.5 * 4.5 = 69.75 and 16.5 * 5.5 = 90.75.
2. **About 70 cm^2; less than 76.125 cm^2.** The estimate is 14 * 10 / 2 = 70. The upper bound is 14.5 * 10.5 / 2 = 76.125.

CHALLENGE

No. Although the estimated area is 17 * 4 = 68 cm^2, its area could approach 17.5 * 4.5 = 78.75 cm^2, which exceeds the limit.

Accept equivalent interval notation with inclusive lower bounds and exclusive upper bounds. Area bounds assume positive side lengths and measurements rounded to the stated precision.