

Shape Area Lab

Cut, rearrange, and measure area.

GRADE 6 • 6.MG.2.a

6.MG.2.a "Develop the formula for determining the area of parallelograms and triangles using pictorial representations and concrete manipulatives (e.g., two-dimensional diagrams, grid paper)."

NAME _____

DATE _____

TURN SHAPES INTO RECTANGLES

Cut a right triangle from one side of a parallelogram and move it to the other side. The pieces make a rectangle with the same base and perpendicular height, so parallelogram area is $A = b \times h$. A diagonal splits a parallelogram into two equal-area triangles, so triangle area is $A = 1/2 \times b \times h$.

WORKED EXAMPLE

A parallelogram has a base of 11 cm and a perpendicular height of 6 cm. Find its area.

1. Picture cutting off a side triangle and moving it to make a rectangle.
2. The rectangle has side lengths 11 cm and 6 cm.
3. $11 \times 6 = 66$.

Answer: 66 cm²

PRACTICE 6 problems

- 1** A parallelogram covers 8 grid squares along its base and 3 grid squares straight up from the base. Find its area.

ANSWER _____

- 2** A triangle has a base of 12 cm and a perpendicular height of 5 cm. Find its area.

ANSWER _____

- 3** After a side triangle is cut and moved, a parallelogram becomes a rectangle that is 9 m by 4 m. What was the area of the parallelogram?

ANSWER _____

- 4** Find the area of a parallelogram with base 7 in. and perpendicular height 10 in.

ANSWER _____

- 5** A diagonal divides a parallelogram with base 18 cm and perpendicular height 2 cm into two triangles. Find the area of one triangle.

ANSWER _____

- 6** Find the area of a triangle with base 15 yd and perpendicular height 4 yd.

ANSWER _____

APPLY IT Show your work

- 1** For a school play, a student paints a triangular backdrop with a base of 14 ft and a perpendicular height of 9 ft. How many square feet will the painted front cover?

WORK SPACE

ANSWER _____

- 2** A skateboard club makes a parallelogram-shaped stencil for a poster. The stencil has a base of 13 in. and a perpendicular height of 8 in. What is its area?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A diagonal divides a parallelogram with base 20 cm and perpendicular height 9 cm into two triangles. Write two sentences to explain why one triangle has an area of 90 cm^2 .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A parallelogram covers 8 grid squares along its base and 3 grid squares straight up from the base. Find its area.	24 square units
2	A triangle has a base of 12 cm and a perpendicular height of 5 cm. Find its area.	30 cm²
3	After a side triangle is cut and moved, a parallelogram becomes a rectangle that is 9 m by 4 m. What was the area of the parallelogram?	36 m²
4	Find the area of a parallelogram with base 7 in. and perpendicular height 10 in.	70 in²
5	A diagonal divides a parallelogram with base 18 cm and perpendicular height 2 cm into two triangles. Find the area of one triangle.	18 cm²
6	Find the area of a triangle with base 15 yd and perpendicular height 4 yd.	30 yd²

PART 2 • APPLY IT

1. **63 ft²** Use $A = \frac{1}{2} \times b \times h$. $\frac{1}{2} \times 14 \times 9 = 63$.
2. **104 in²** Use $A = b \times h$. $13 \times 8 = 104$.

CHALLENGE

The parallelogram's area is $20 \times 9 = 180 \text{ cm}^2$. The diagonal makes two equal-area triangles, so one triangle has area $180 / 2 = 90 \text{ cm}^2$.

Accept equivalent calculations that use the perpendicular height, not a slanted side. For the challenge, accept any two-sentence explanation that finds 180 cm^2 for the parallelogram and halves it to 90 cm^2 .