

Grade 6 - Area of Triangles and Polygons - Lesson

Common Core 6.G.A.1 · maths-pdf.fr/en/

The area of a triangle is half the base times the height, $A = (1/2)bh$, because two copies of a triangle make a parallelogram. A parallelogram has area $A = bh$. To find the area of a trapezoid or another polygon, split it into rectangles and triangles, then add the areas. The height is perpendicular to the base.

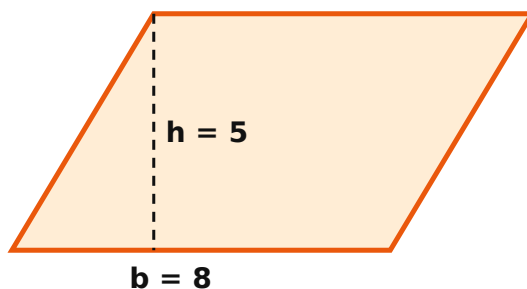
Grade 6 · Common Core State Standards: **6.G.A.1**

Key facts

- Rectangle and parallelogram: $A = bh$.
- Triangle: $A = (1/2)bh$.
- Trapezoid: split into two triangles, or use $A = (1/2)(b_1 + b_2)h$.
- The height is perpendicular to the base, not the slanted side.
- Area is measured in square units.

How do you find the area of a rectangle and a parallelogram?

The area of a rectangle is $A = bh$, the base times the height. A parallelogram has the same area formula. Cut a triangle from one end and slide it to the other end, and the parallelogram becomes a rectangle with the same base and height.



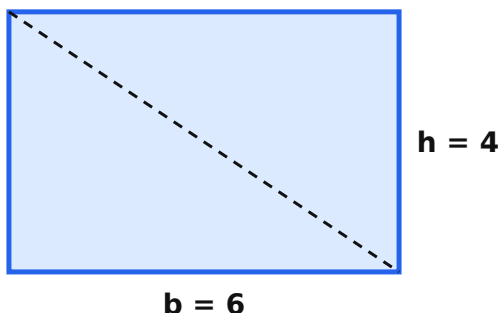
Move the triangle on one side to the other and you get a 8 by 5 rectangle: 40.

The height must be *perpendicular* to the base. It is not the length of the slanted side.

How do you find the area of a triangle?

Area of a triangle

The area of a triangle is half the area of a rectangle or parallelogram with the same base and height: $A = \frac{1}{2}bh$.

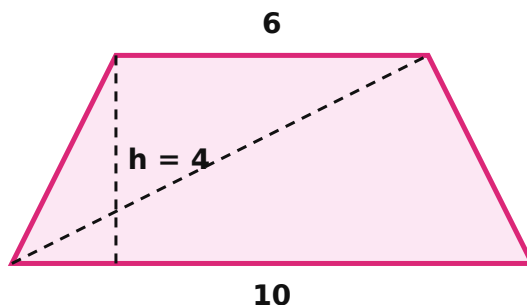


Two equal triangles fill a rectangle, so a triangle has half the area: 12.

For a triangle with base 10 and height 7, $A = \frac{1}{2} \cdot 10 \cdot 7 = 35$ square units. If you know the area and the height, you can find the base by solving $A = \frac{1}{2}bh$.

How do you find the area of a trapezoid?

Split the trapezoid with a diagonal into two triangles that share the same height. For bases 10 and 6 and height 4, the triangles have areas $\frac{1}{2} \cdot 10 \cdot 4 = 20$ and $\frac{1}{2} \cdot 6 \cdot 4 = 12$, so the trapezoid has area $20 + 12 = 32$.

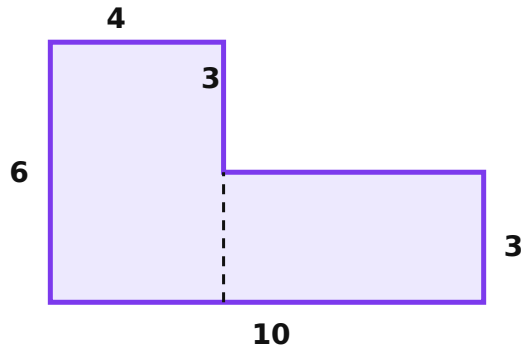


The area is $20 + 12 = 32$.

How do you find the area of other polygons?

1. Decide how to split the polygon into rectangles and triangles, or how to subtract a missing piece.
2. Find the base and height of each piece, using the labeled lengths.
3. Compute each area and add (or subtract) the areas.

4. Write the unit as square units.



Decompose into rectangles: $10 \times 3 + 4 \times 3 = 42$.

Example: The L-shape above can be made of a 10×3 rectangle and a 4×3 rectangle, so its area is $30 + 12 = 42$ square units.

Questions about area of triangles and polygons

What is the formula for the area of a triangle?

The area of a triangle is $A = (1/2)bh$, where b is the base and h is the height perpendicular to the base.

Why is the area of a triangle half of base times height?

Two identical triangles can be put together to make a parallelogram with the same base and height, so each triangle has half the area.

How do you find the area of a parallelogram?

Multiply the base by the perpendicular height. Do not use the length of the slanted side.

How do you find the area of a trapezoid?

Split it into two triangles with the same height, and add their areas. You can also average the two bases and multiply by the height.

How do you find the area of an irregular polygon?

Decompose it into rectangles and triangles, find each area, and add them. You can also subtract a missing piece from a larger rectangle.