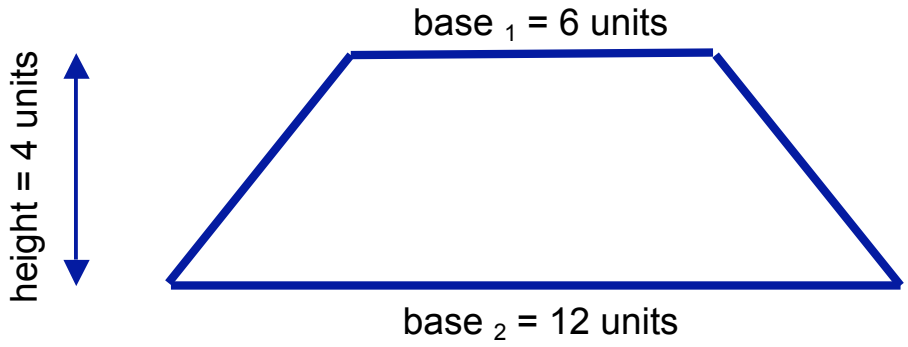
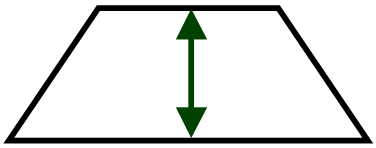
TRAPEZOID



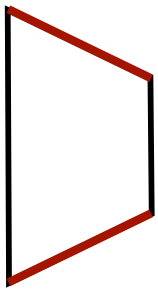
Properties:

- **Quadrilateral polygon with one pair of parallel sides called bases**



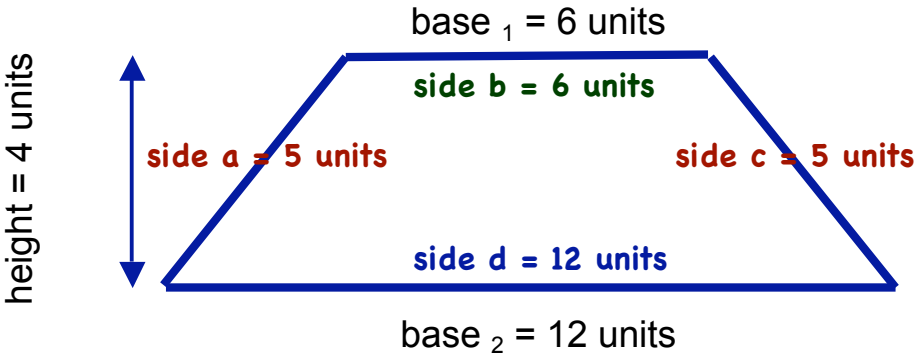
- **Perpendicular distance between bases is called height**

- **Non-parallel sides are called legs**



Note:
The trapezoid (US) is referred to as a trapezium in English outside North America.

Perimeter



P = (side **a**) + (side **b**)+ (side **c**) + (side **d**)

= **5** units + **6** units + **5** units + **12** units

= **28** units (linear units)

Area

$$\mathbf{A} = \frac{1}{2} \times \mathbf{h} \times (\mathbf{base_1} + \mathbf{base_2})$$

$$= \frac{1}{2} \times \mathbf{4}\text{ units} \times (\mathbf{6}\text{ units} + \mathbf{12}\text{ units})$$

= **2** units x **18** units

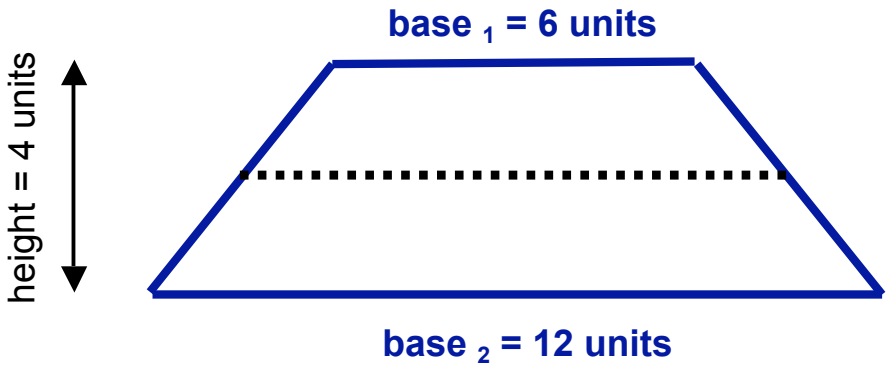
= **36** square units or 36 units^2

Elementary Interpretation:

Determine "one half" of height.
Multiply result by the sum of the two bases

Explore:

$$A = \frac{1}{2} \times h \times (base_1 + base_2)$$



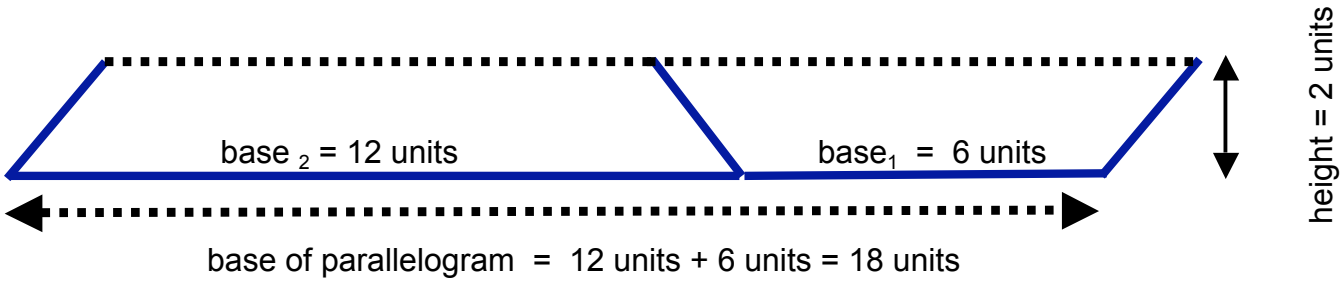
Area = 36 sq units

- **Draw a trapezoid on grid paper**
- **Cut out and fold along dotted line**
- **Cut along fold**

Elementary Interpretation:

Determine "one half" of height.

$$\frac{1}{2} \times h$$



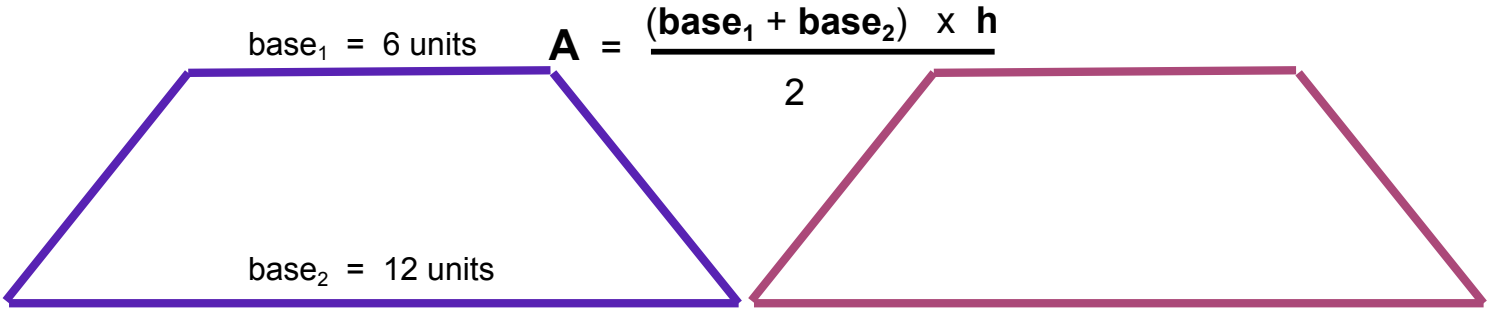
- **Place parts to form a parallelogram**
- **Determine area of parallelogram**
- **Compare area of parallelogram to area of trapezoid**

Elementary Interpretation:

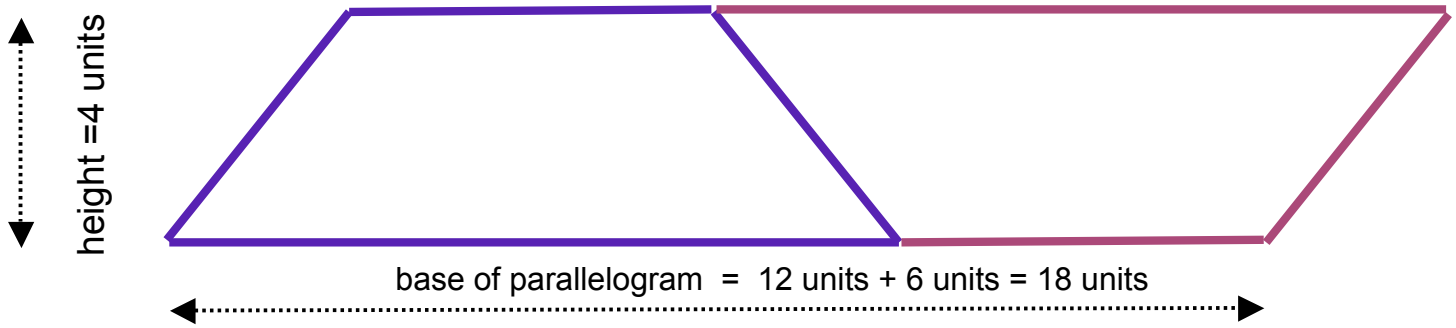
Show two trapezoid bases as one base of parallelogram

Explore:

Commutative Property allows several different ways to calculate area of trapezoid.



- **Draw two congruent trapezoids on grid paper**
- **Cut out one**



- **Turn and slide cut out to right of the other**
- **Calculate area of parallelogram**
- **Divide area of parallelogram by 2**

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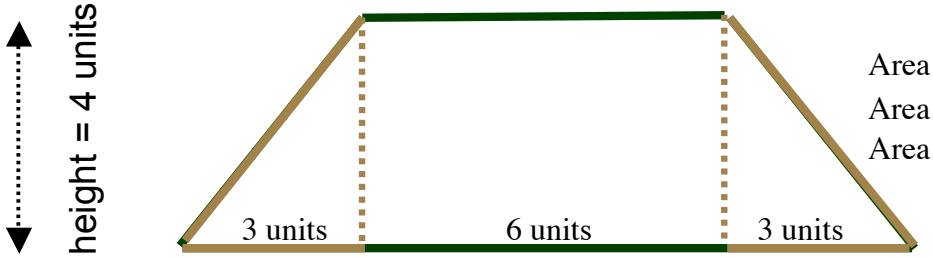
Explore:

The trapezoid can be sectioned into other figures and their areas added to calculate area of trapezoid.

Area of trapezoid = 36 sq units



Area of triangle$_1$ = 6 sq units
Area of triangle$_2$ = 6 sq units
Area of rectangle = 24 sq units

- **Determine areas of triangles**
- **Determine area of rectangle**
- **Add areas of triangles and rectangle**
- **Compare sum to area of trapezoid**