

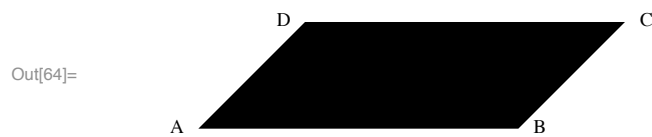
---

## Areas of parallelograms and triangles

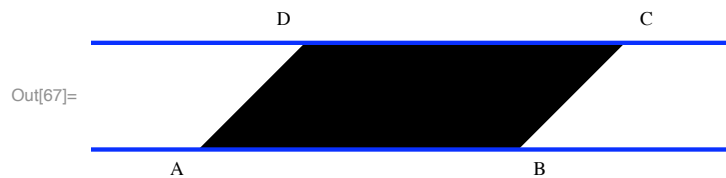
---

**"area of a parallelogram = base times height"**

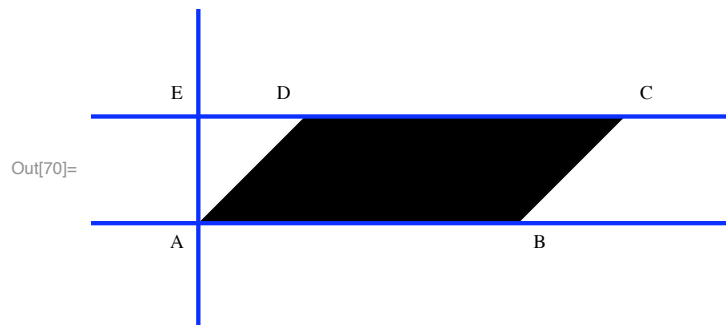
- Choose one side as the base



- Extend the base side and its parallel



- Draw the perpendicular to the base side passing through A; call its intercept with the parallel line E.

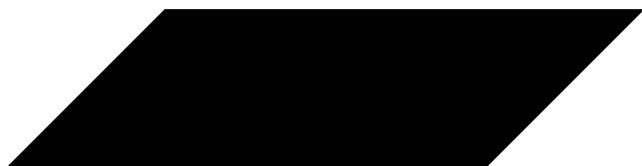


- Base length =  $|AB|$ ; height =  $|AE|$ .

---

## Constructing rectangles out of parallelograms

Out[33]=



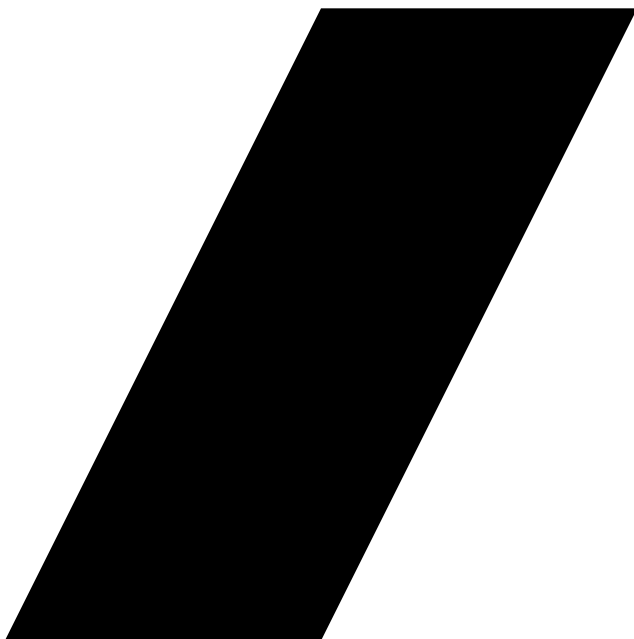
Out[34]=



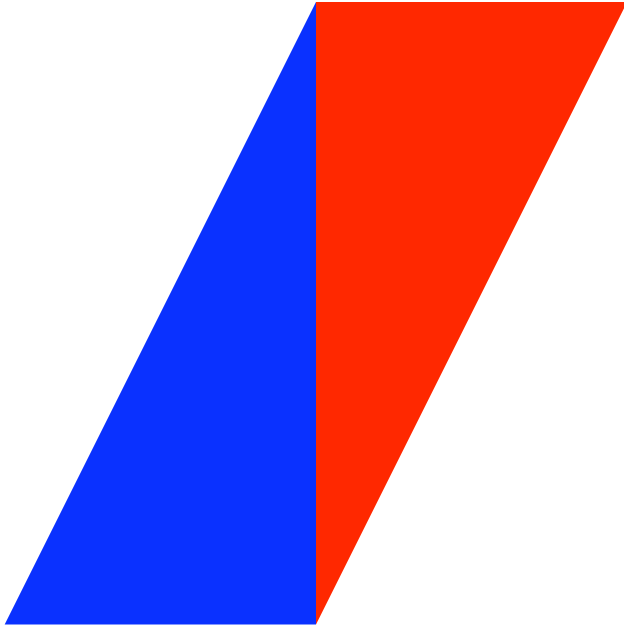
Out[35]=



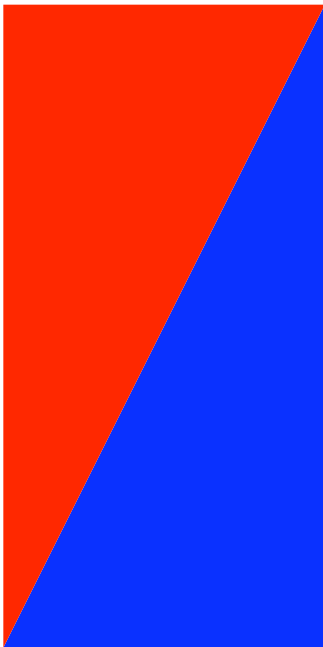
Out[14]=



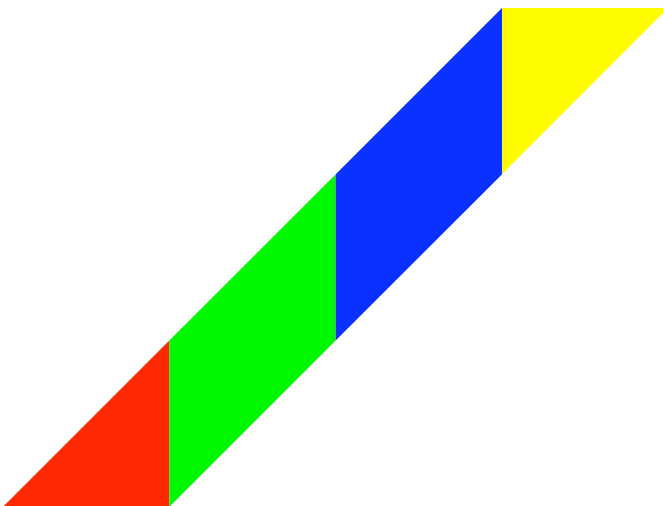
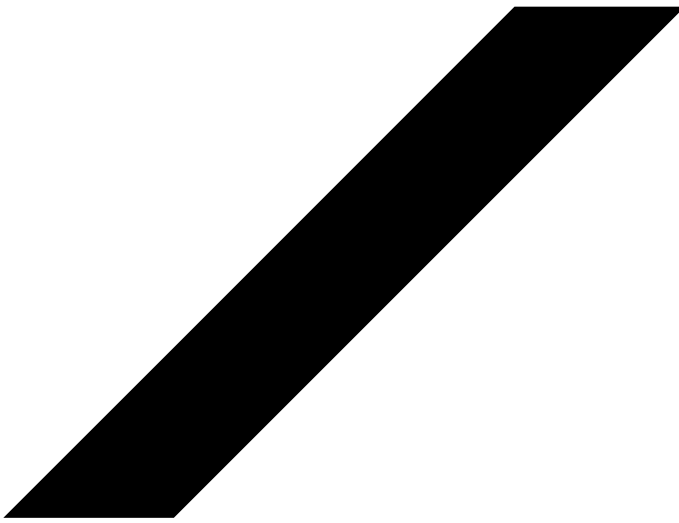
Out[15]=

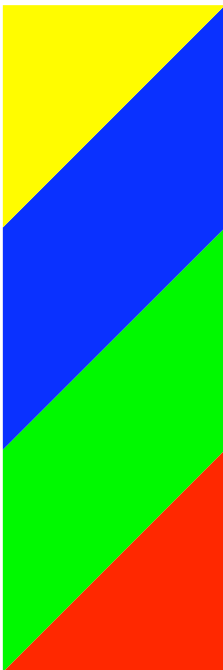
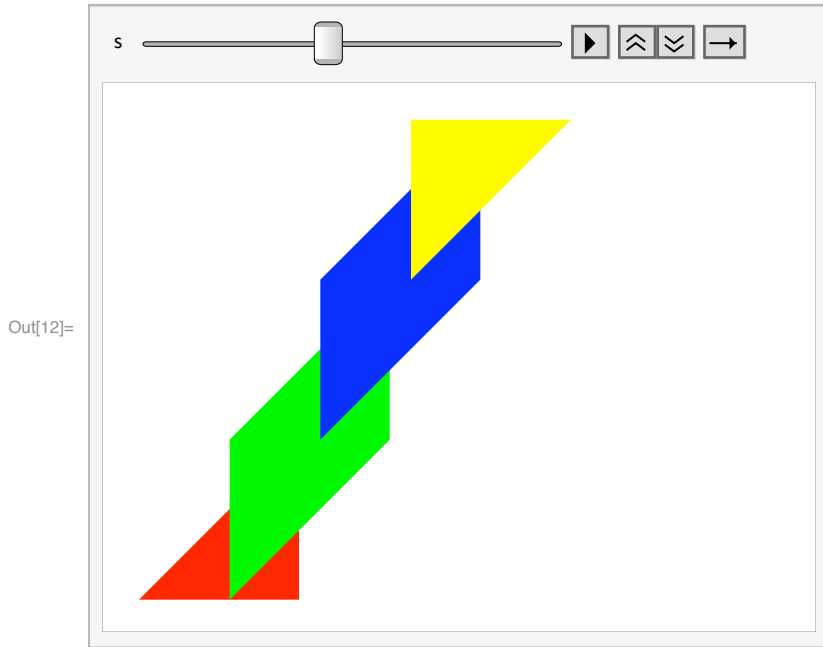


Out[17]=



- If we insist on only using vertical cuts, with the parallelogram in its original position, building the rectangle may require multiple cuts





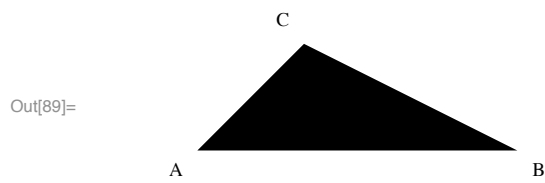
- If we rotate the parallelogram first, or cut at a different angle, we can use a single cut



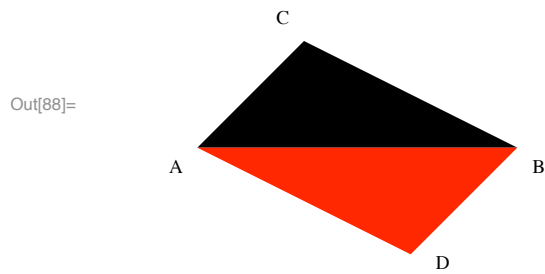


---

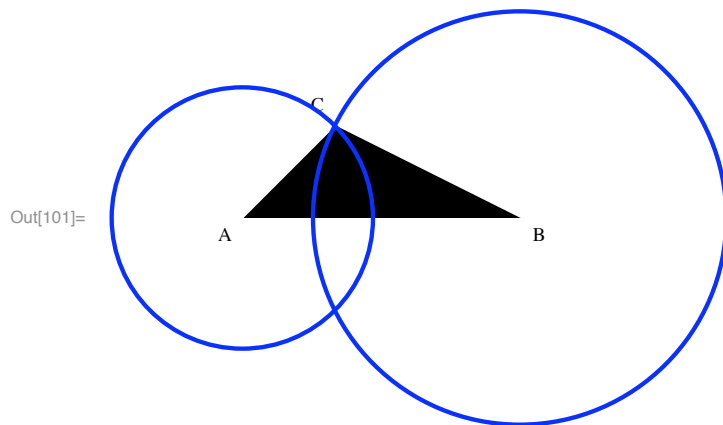
"area of a triangle =  $\frac{1}{2}$  base x height"



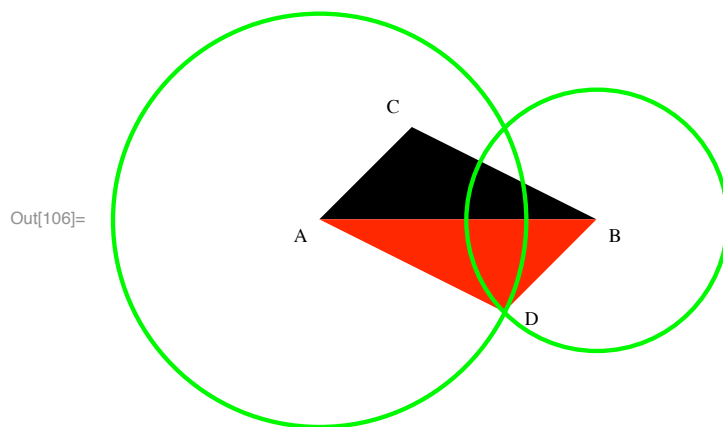
- Build the congruent triangle with common side AB. The combination is a parallelogram.



■ How?



- Draw the circle with radius  $|AC|$  centered at  $B$  and the circle of radius  $|BC|$  centered at  $A$ . The intersection point 'across  $AB$  from  $C$ ' is the fourth vertex,  $D$ .



■ Code