

11. [10] Given a triangle ABC on a patty paper, find a triangle inside $\triangle ABC$ that is half the area of $\triangle ABC$. Explain your process and *justify* why your method works. Make sure that your method works with all kinds of triangles and not just on special ones.

Hint: the area of a triangle is $\frac{1}{2} \cdot \text{base} \cdot \text{height}$.

This is a patty paper exercise so the only tools you may use are patty paper(s) and a pencil.

FNoe: this is not the only possible solution.]

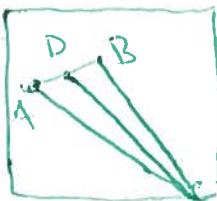
Since the area of a Δ is $\frac{1}{2} \cdot \text{base} \cdot \text{height}$, to find a Δ with half the area we either need to half the base length or half the height length.

Given a $\triangle ABC$, let \overline{AB} be called the base.

Fold the line back \overline{AB} back on itself so that the point A lies on B. The fold directions are provided above & a picture of this is on the right.



Unfold. We now have the halfway point between A+B denote the point as D. Use another patty paper to draw a straight line from D to C.



The triangle ADC has half the area of $\triangle ABC$ because the base of ADC is $\frac{1}{2}$ the base of $\triangle ABC$.

Notice $\triangle DBC$ also has half the area of $\triangle ABC$.

directions: (+)

Thought process: actively trying different things (+1) Clarity: clear (+2)
reflecting on past failed attempts. (+2) mostly clear (+1.5)
referring to known geometry (+1) sometimes clear (+1)
Transformation: evolving and improving (+1) pictures. (+1)