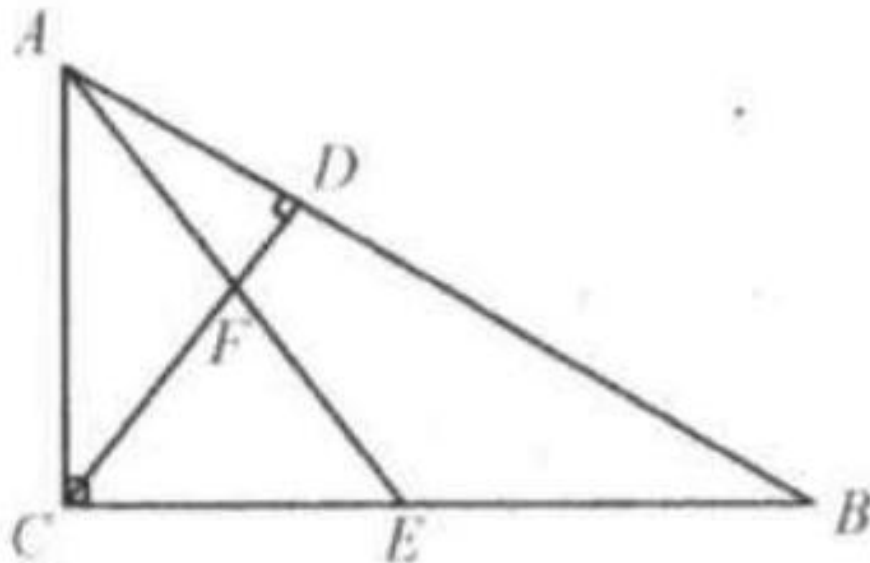


## Problem

(2013 Mathcounts National Sprint 28) In right triangle  $ABC$ , shown here,  $AC = 5$  units and  $BC = 12$  units. Points  $D$  and  $E$  lie on  $AB$  and  $BC$ , respectively, so that  $CD$  is perpendicular to  $AB$  and  $E$  is the midpoint of  $BC$ . Segments  $AE$  and  $CD$  intersect at point  $F$ . What is the ratio of  $AF$  to  $FE$ ? Express your answer as a common fraction.

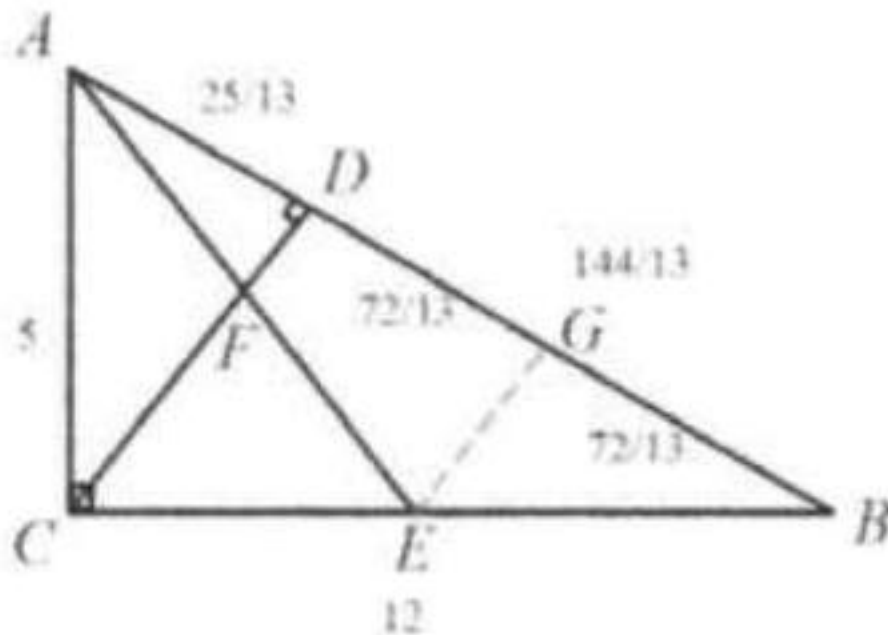


## Solution

25/72. Triangle  $ABC$  is a 5-12-13 right triangle, so  $AB = 13$ .

We can determine from similar triangles  $AD = \frac{25}{13}$  and

$$DB = \frac{144}{13}.$$



Draw  $EG \parallel FD$ .

Since  $CE = EB$ ,  $DG = BG = \frac{1}{2} \times \frac{144}{13} = \frac{72}{13}$ .  
 Since triangle  $AFD$  is similar to triangle  $AEC$ ,

$$\frac{AF}{FE} = \frac{AD}{DG} = \frac{\frac{25}{13}}{\frac{72}{13}} = \frac{25}{72}.$$