Problem 1

Problem

(AMC) Let line AC be perpendicular to line CE. Connect A to the midpoint D of CE, and connect E to the midpoint B of AC. If AD and EB intersect in point F, and $BC = CD = 15$ inches, find the area of triangle DFE in square inches.

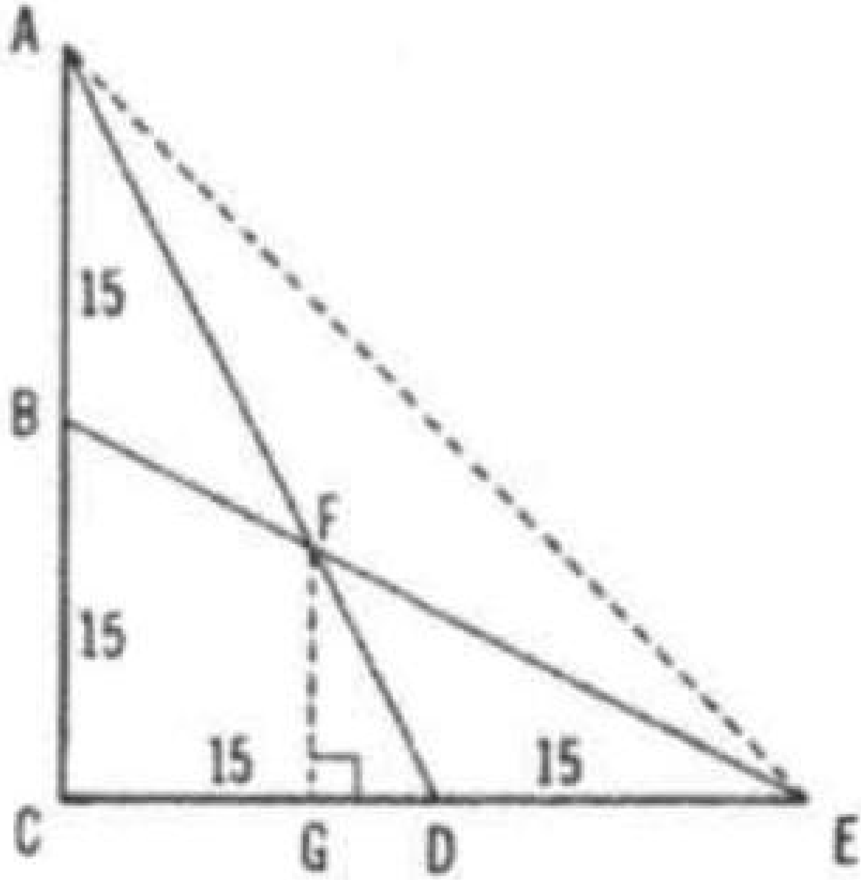
Solution

(C).

Method 1 (official solution):

Draw AE and the altitude FG to the base DE of triangle DEF. Since F is the intersection point of the medians of a triangle $ACE, FD = \frac{1}{3}AD$.

$\therefore FG = \frac{1}{3}AC = \frac{1}{3} \cdot 30 = 10.$



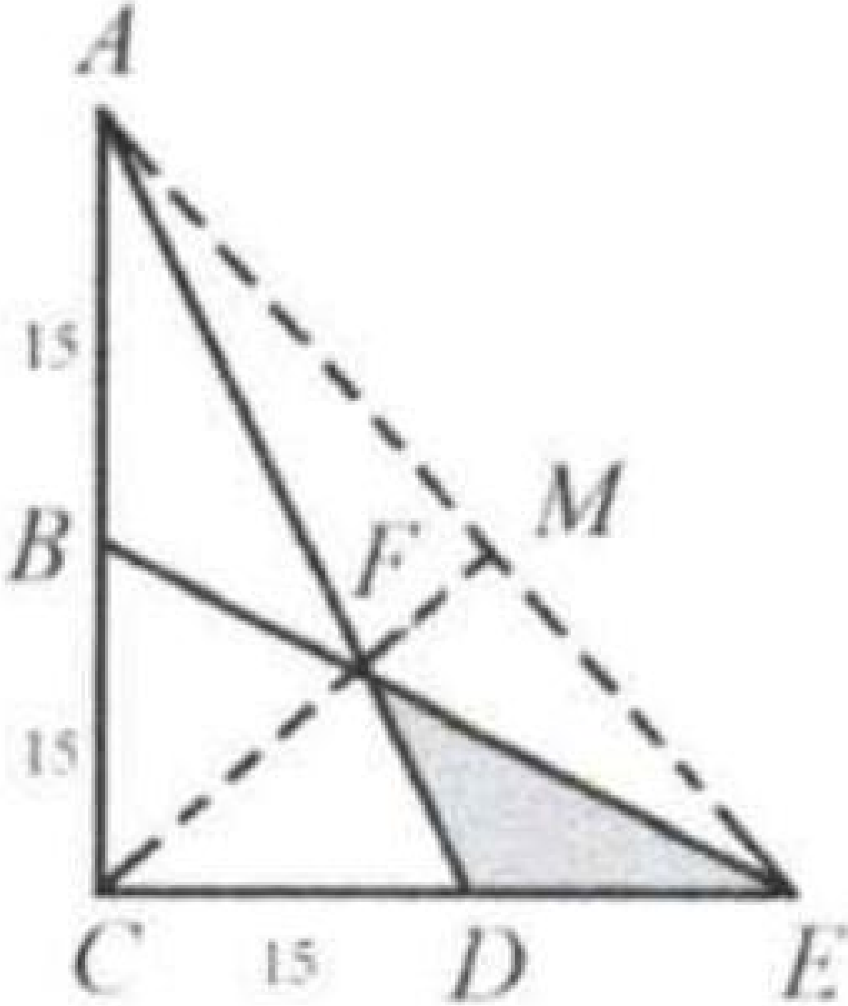
$\therefore$ area($\triangle DEF$) $= \frac{1}{2} \cdot 15 \cdot 10 = 75$.

The three medians of a triangle divide the triangle into six triangles of equal area. Therefore, Area($\triangle FDE$) $= 75$.

Method 2 (our solution):

Connect AE. Then connect CF and extend it to meet AE at M. F is the centroid and triangle ACE is divided into six smaller triangles with the same area.

The area of ($\triangle ACD$) $= \frac{1}{2} \cdot 30 \cdot 15 = 225$. The area of



$(\triangle FDE) = \frac{225}{3} = 75.$