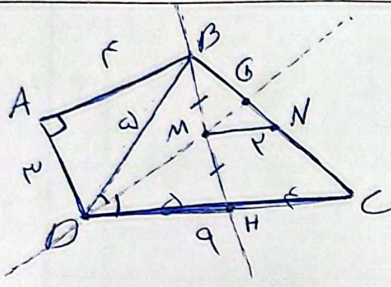


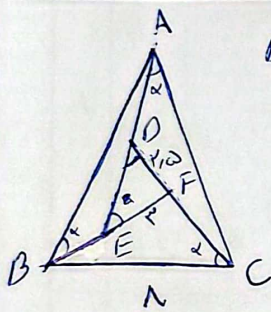
$$\frac{S_{BCE}}{S_{BDE}} = \frac{BC}{DE} = \frac{AB}{AD} = \frac{12}{5} = \boxed{2,4}$$

۱



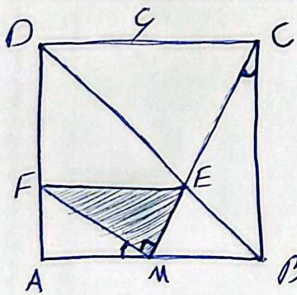
$BPM \sim MDH \Rightarrow PH = BD = 5 \rightarrow HC = 4$
 BH وسط M $\Rightarrow BM = MH \Rightarrow$ قضیه فیثاغورس
 $\frac{BM}{BH} = \frac{MN}{HC} = \frac{1}{2} \Rightarrow \frac{MN}{4} = \frac{1}{2} \Rightarrow \boxed{MN = 2}$

۲



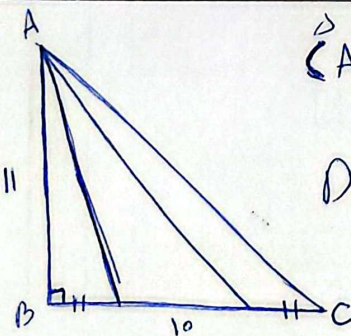
$\triangle DEF \sim \triangle ABC$
 $\left. \begin{array}{l} \angle F = \angle B \\ \angle D = \angle C \\ \angle E = \angle A \end{array} \right\} \Rightarrow \frac{AB}{2} = \frac{1}{1/2} \rightarrow 2,5 AB = 2,5$
 $AB = \frac{2,5}{1,25} = \boxed{9,4}$

۳



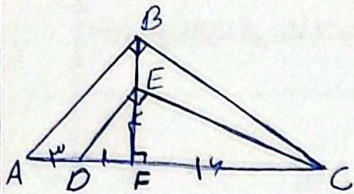
$MC^2 = 4^2 + 9 = 25 \Rightarrow MC = 5$
 $\tan F = \frac{5}{AF} = \tan M = \frac{4}{2} = 2 \Rightarrow \frac{MF}{AF} = 2 \Rightarrow AF = \frac{5}{2}$
 $MF^2 = \frac{9}{4} + 9 = \frac{45}{4} \Rightarrow MF = \frac{3\sqrt{5}}{2}$
 $\frac{MF}{2} = 2 \Rightarrow ME = \sqrt{4^2 + 9} = 5 \Rightarrow ME = \sqrt{5}$
 $\text{مساحت مثلث} = \frac{MF \times ME}{2} = \frac{\frac{3\sqrt{5}}{2} \times \sqrt{5}}{2} = \boxed{3,75}$

۴



$\triangle ABE \sim \triangle ADE \Rightarrow E$ مشترک $\Rightarrow \frac{AE^2 + 14^2}{10} = \frac{DC + 10}{\sqrt{DC^2 + 14^2}}$
 $\angle ABE = \angle ACP$
 $DC^2 + 14^2 = 100 + 10DC$
 $DC^2 - 10DC + 14^2 = 0 \Rightarrow DC = \boxed{7}$

۵



$$EF^2 = DF \times FC \Rightarrow 14 = 3 \times FC$$

$$FC = 14$$

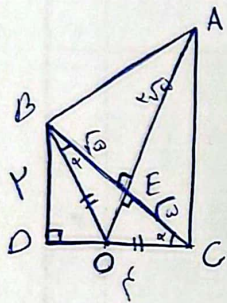
$$BC^2 = CF \times AC = 14 \times 20 \Rightarrow BC = 1\sqrt{14}$$

6

$x^2 + x^2 = 14 \Rightarrow 2x^2 = 14 \Rightarrow x = 1\sqrt{2}$ * میانه دارد بر آن نصف کننده (وتر) است.
نصف قدرت قائم الزامیه است.

میانه نظیر هرسان $= \sqrt{(1\sqrt{2})^2 + (1\sqrt{2})^2} = \sqrt{2+2} = \sqrt{4} = 2$

7



$$BC = \sqrt{2^2 + 4^2} = \sqrt{20} = 2\sqrt{5} = 2DE = 2EC$$

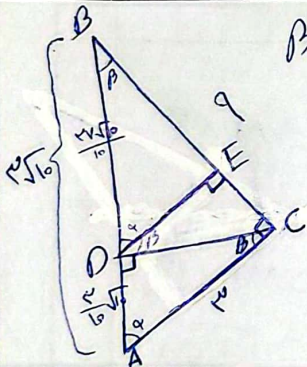
$$BE = EC = \sqrt{5}$$

$$AEC \sim BCD \Rightarrow \frac{2}{\sqrt{5}} = \frac{5}{AE} = \frac{2\sqrt{5}}{5} \Rightarrow$$

$$AE = \sqrt{5} \Rightarrow S_{ABE} = \frac{AE \times EC}{2} = \frac{(\sqrt{5})(\sqrt{5})}{2} = \frac{5}{2}$$

QE- میانه نظیر هرسان وجود نصف است.

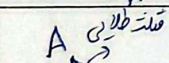
8



$$BD = \frac{9 \times 9}{2\sqrt{10}} = \frac{27}{10} \sqrt{10} \Rightarrow BD = \frac{27}{10} \sqrt{10} \times 9 \Rightarrow$$

$$\frac{27 \times 9}{20} = 1,1$$

9



$$ADE \sim ABH \rightarrow \frac{DE}{BH} = \frac{AE}{14}$$

$$BH \Rightarrow 14 \times 12 = BH \times 20 \Rightarrow BH = 9,6$$

$$14^2 = AH \times 20 \Rightarrow \frac{AH}{2} = AE = 4,9$$

$$DE = \frac{9,6 \times 4,9}{14} = 2,84$$

10