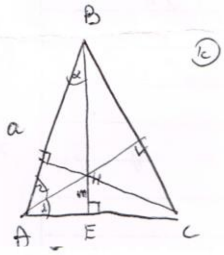
2.83
6



(ב)

$\measuredangle C = 90-\alpha$

$\measuredangle A_1 = \alpha$

$\measuredangle A_2 = 90-2\alpha$

$\triangle AHB$: $\frac{AH}{\sin\alpha} = \frac{AB}{\sin(90+\alpha)} \rightarrow AH = \frac{a\sin\alpha}{\cos\alpha} = a\tan\alpha$

(ג)

$$\frac{HE}{AH} = \sin\alpha \rightarrow \frac{m}{a\tan\alpha} = \sin\alpha$$

$$m = \frac{a\sin^2\alpha}{\cot\alpha} \rightarrow m\cot\alpha = a(1-\cot^2\alpha)$$

$$a\cot^2\alpha + m\cot\alpha - a = 0 \qquad \cot\alpha = \frac{-m\pm\sqrt{m^2+4a^2}}{2a}$$

בחר + כי $0<\alpha<90$ לכן $\cot\alpha>0$.

(ד)

$$\cot\alpha = \frac{-9+\sqrt{81+1600}}{40} = \frac{-9+41}{40} = \frac{4}{5}$$

$$\sin\alpha = \sqrt{1-\left(\frac{4}{5}\right)^2} = \frac{3}{5} \longrightarrow \tan\alpha = \frac{3}{4}$$

$$S = \frac{AB\cdot AC\cdot\sin\measuredangle A}{2}$$

$$AE = \sqrt{AH^2-HE^2} = \sqrt{\left(20\cdot\frac{3}{4}\right)^2-9^2} = 12$$

$$AC = 2AE = 24$$

$$\sin\measuredangle A = \sin(90-\alpha) = \cot\alpha = \frac{4}{5}$$

$$S = \frac{20\cdot24\cdot\frac{4}{5}}{2} = 192$$