



$$S_{\triangle ABC} = \frac{1}{2} AB \cdot AC \cdot \sin \alpha = \frac{1}{2} (\sqrt{r})(4)(\sin \alpha) = 2\sqrt{r} \sin \alpha$$

$$2\sqrt{r} \sin \alpha = \frac{9}{r} \Rightarrow \sin \alpha = \frac{9}{r \times 2\sqrt{r}} \times \frac{\sqrt{r}}{\sqrt{r}} = \frac{\sqrt{r}}{r}$$

$$\sin \alpha = \frac{\sqrt{r}}{r} \xrightarrow{0 < \alpha < 180^\circ} \begin{cases} \alpha_1 = 30^\circ \\ \alpha_2 = 150^\circ \end{cases} \Rightarrow \frac{\alpha_2}{\alpha_1} = 1$$

$$a = 2K \quad b = 3K$$

$$(2K)(3K) \sin 120^\circ = \Delta$$

$$4K^2 \times \frac{1}{2} = \Delta$$

$$2K^2 = \Delta \rightarrow K^2 = \frac{\Delta}{2}$$

$$K = \sqrt{\frac{\Delta}{2}}$$

$$\text{مجموع} = (4\sqrt{r} + 4\sqrt{r}) \div 2 = 4\sqrt{r}$$

$$S_{\triangle ABC} - S_{\triangle ADE} = 1/VA$$

$$\frac{1}{2} \times 6 \times V \times \sin A - \frac{1}{2} \times 4 \times V \times \sin A = 1 + 0/VA \rightarrow \left(\frac{6}{2} - \frac{4}{2}\right) \sin A = 1 + \frac{0}{V}$$

$$\Rightarrow \frac{V}{2} \sin A = \frac{V}{2} \Rightarrow \sin A = \frac{1}{2} \Rightarrow A = 30^\circ$$

$$\tan A = \tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\frac{BMN}{ABC} = \frac{BM}{AB} \times \frac{BN}{BC}$$

$$ABC = 3 \quad BMN = 1$$

$$AM = AB - BM = AB - \frac{4}{9} AB = \frac{5}{9} AB$$

$$\frac{1}{3} = \frac{BM}{AB} \times \frac{4}{9}$$

$$\frac{BM}{AB} = \frac{1}{3} \times \frac{9}{4} = \frac{3}{4}$$

$$BM = \frac{3}{4} AB$$

$$\frac{BM}{AM} = \frac{\frac{4}{9} AB}{\frac{5}{9} AB} = \boxed{\frac{4}{5}}$$

$$\frac{1}{\sqrt{\cos^2 \alpha}} - \tan \alpha = \frac{1 + \sin \alpha}{|\cos \alpha|} \Rightarrow \frac{1}{|\cos \alpha|} - \frac{1 + \sin \alpha}{|\cos \alpha|} = \tan \alpha \Rightarrow \frac{1 - (1 + \sin \alpha)}{|\cos \alpha|} = \frac{\sin \alpha}{\cos \alpha}$$

$$\Rightarrow \frac{-\sin \alpha}{|\cos \alpha|} = \frac{\sin \alpha}{\cos \alpha} \Rightarrow \frac{-1}{|\cos \alpha|} = \frac{1}{\cos \alpha} \Rightarrow |\cos \alpha| = -\cos \alpha \Rightarrow \cos \alpha < 0$$

$$\frac{|\sin \alpha|}{\cos \alpha} = \frac{-1}{\cos \alpha} \Rightarrow \frac{|\sin \alpha|}{\cos \alpha} = \frac{-1}{\cos \alpha} \Rightarrow \frac{|\sin \alpha|}{\cos \alpha} = \frac{-\sin \alpha}{\cos \alpha} \Rightarrow |\sin \alpha| = -\sin \alpha$$

$$\downarrow$$

المثلث قائم الزاوية  $\sin \alpha < 0$

$$\Rightarrow \sin \alpha < 0$$