



$$S_{ABC} = \frac{1}{2} \sin \alpha \cdot AB \cdot AC = \frac{1}{2} \sin \alpha \times 1 \times \sqrt{2} = \frac{1}{2} \sqrt{2} \sin \alpha$$

$$\Rightarrow \sin \alpha = \frac{1/\sqrt{2}}{\frac{1}{2}\sqrt{2}} = \frac{1/\sqrt{2}}{\frac{\sqrt{2}}{2}} = \frac{1/\sqrt{2} \times 2}{\sqrt{2}} = \frac{2}{2} = 1 \quad \sin \alpha = \frac{\sqrt{2}}{2} \begin{cases} \alpha = \frac{\pi}{4} \text{ (max)} \\ \alpha = \frac{3\pi}{4} \text{ (max)} \end{cases}$$

$$\frac{\alpha_{\max}}{\alpha_{\min}} = \frac{\frac{\pi}{4}}{\frac{3\pi}{4}} = \frac{1}{3}$$

$$\begin{cases} S = 0.5 \\ \frac{a}{b} = \frac{1}{\sqrt{2}} \\ \alpha = 150^\circ \end{cases} \Rightarrow \begin{cases} a = 2m \\ b = 2\sqrt{2}m \end{cases} \Rightarrow S = \frac{1}{2} ab \sin \alpha = \frac{1}{2} \times 2m \times 2\sqrt{2}m \times \frac{1}{2} = 2\sqrt{2}m^2 = 0.5 \Rightarrow m^2 = \frac{1}{4\sqrt{2}} \Rightarrow m = \frac{1}{2\sqrt{2}}$$

$$a = 2m = \frac{1}{\sqrt{2}} \times \frac{1}{2\sqrt{2}} = \frac{1}{4} \quad b = 2\sqrt{2}m = \frac{1}{2} \quad p = r(a+b) = \frac{1}{2} \times \left(\frac{1}{4} + \frac{1}{2}\right) = \frac{3}{8}$$

$$S_{ADC} - S_{ADE} = 1/\sqrt{2} \Rightarrow \frac{1}{2} \sin A \times \sqrt{2} \times \sqrt{2} - \frac{1}{2} \sin A \times \sqrt{2} \times 1 = 1/\sqrt{2}$$

$$\Rightarrow \frac{1}{2} \sin A \times 2 - \frac{1}{2} \sin A \times \sqrt{2} = 1/\sqrt{2} \Rightarrow \sin A = \frac{1}{\sqrt{2}} \Rightarrow A = 45^\circ \quad \tan A = \tan 45^\circ = 1$$



$$\frac{S_{ADC}}{S_{BMN}} = \frac{\frac{1}{2} \times AB \times AC \times \sin B}{\frac{1}{2} \times BM \times BN \times \sin B} = 4 \Rightarrow \frac{AB}{BM} = 2 \Rightarrow \frac{AM}{BM} = 1$$

$$\Rightarrow \frac{AM}{BM} = \frac{AN}{BN} \Rightarrow AM = AN \Rightarrow \frac{AM}{AN} = \frac{BM}{BN} = 1/2$$

$$\frac{1}{\sqrt{1+\sin \alpha}} = \tan \alpha = \frac{1+\sin \alpha}{1-\sin \alpha} \Rightarrow \frac{1}{1-\sin \alpha} = \frac{1+\sin \alpha}{1-\sin \alpha} \Rightarrow -\frac{\sin \alpha}{1-\sin \alpha} = \frac{1+\sin \alpha}{1-\sin \alpha}$$

$$\begin{cases} (1-\sin \alpha) > 0 \Rightarrow -\sin \alpha = 1+\sin \alpha \Rightarrow \sin \alpha = -1 \Rightarrow \alpha = \frac{3\pi}{2} \\ (1-\sin \alpha) < 0 \Rightarrow -\sin \alpha = 1+\sin \alpha \Rightarrow \sin \alpha = -1 \Rightarrow \alpha = \frac{3\pi}{2} \end{cases}$$