

$$ab \sin 100^\circ = \frac{1}{4} \quad \frac{a}{b} = \frac{r}{\sqrt{r}} \Rightarrow a = \frac{rb}{\sqrt{r}}$$

$$ab = 101$$

$$\frac{rb}{\sqrt{r}} \times b = 101 \Rightarrow rb^2 = 101r \Rightarrow b^2 = 101 \Rightarrow b = \sqrt{101} \Rightarrow a = \frac{r(\sqrt{101})}{\sqrt{r}} = \sqrt{101}$$

$$\text{مساحة المثلث} = r(\sqrt{101} + \sqrt{101}) = 2\sqrt{101}$$

$$S_{ABC} - S_{ADE} = 1/4 \Rightarrow \frac{rb}{\sqrt{r}} \sin A - 1r \sin A = \sin A \left(\frac{rb}{\sqrt{r}} - 1r \right) \Rightarrow \frac{rb}{\sqrt{r}} \sin A = 1/4 \Rightarrow \sin A = \frac{1}{4} \Rightarrow A = 30^\circ$$

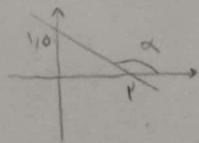
$$S_{ADE} = \frac{1}{2} \times \sqrt{r} \times \sqrt{r} \sin A = 1r \sin A \quad S_{ABC} = \frac{1}{2} \times \sqrt{r} \times \sqrt{r} \sin A = \frac{rb}{\sqrt{r}} \sin A$$

$$\tan 30^\circ = \frac{\sqrt{r}}{r}$$

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

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

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



$$y = ax + b \rightarrow 10 = a(\cdot) + b \Rightarrow b = 10$$

$$y = \frac{r}{10}x + \frac{b}{10} \Rightarrow 10 = \frac{r}{10}x \Rightarrow x = 10 \Rightarrow a = \frac{1}{10} \Rightarrow \tan \alpha = \frac{r}{10}$$

$$\tan \left(\frac{\pi}{2} - \alpha \right) = -\cot \alpha, \cot \alpha = \frac{1}{\tan \alpha} \Rightarrow \tan \left(\frac{\pi}{2} - \alpha \right) = -\frac{1}{\tan \alpha}$$

90 درجة ناقص alpha

$$\frac{r \cos(\frac{\pi}{2} - \alpha) - r \sin(\frac{\pi}{2} - \alpha)}{\sin(\frac{\pi}{2} - \alpha) - \cos(\frac{\pi}{2} - \alpha)} = \frac{-r \sin(\frac{\pi}{2}) - r \sin(\frac{\pi}{2})}{-\sin(\frac{\pi}{2}) - \sin(\frac{\pi}{2})} = \frac{-2r \sin(\frac{\pi}{2})}{-2 \sin(\frac{\pi}{2})} = r$$

$$\frac{\cos \alpha}{\sin(\frac{\pi}{2} + \alpha) - \sin(\alpha - \frac{\pi}{2})} = \frac{\cos \alpha + \sin \alpha}{|\tan^2 \alpha - 1|} = \frac{\frac{r}{10} - \frac{\sqrt{10}}{r}}{\frac{10}{r} - 11} = \frac{\frac{r - \sqrt{10}}{r}}{\frac{10 - 11r}{r}} = \frac{r - \sqrt{10}}{10 - 11r}$$

$$\cos^2 \alpha + \sin^2 \alpha = 1 \Rightarrow \frac{r}{10} + \sin^2 \alpha = 1 \Rightarrow \sin^2 \alpha = \frac{10 - r}{10} \Rightarrow \sin \alpha = \frac{\sqrt{10 - r}}{\sqrt{10}}, \tan \alpha = \frac{-\frac{\sqrt{10}}{r}}{\frac{\sqrt{10 - r}}{\sqrt{10}}} = -\frac{\sqrt{10}}{r} \Rightarrow \tan^2 \alpha = \frac{0}{r}$$

$$\sin \alpha = r \cos \alpha \rightarrow \cos^2 \alpha + \sin^2 \alpha = 1 \Rightarrow \cos^2 \alpha + r^2 \cos^2 \alpha = 1 \Rightarrow \cos^2 \alpha (1 + r^2) = 1 \Rightarrow \cos^2 \alpha = \frac{1}{1 + r^2}$$

$$\cos \alpha = -\frac{1}{\sqrt{1 + r^2}} = -\frac{\sqrt{10}}{10}$$

$$r m x + (m^2 - 1)y = r \Rightarrow y = -\frac{r m}{m^2 - 1} x + \frac{r}{m^2 - 1}$$

$$\tan \theta_0 = \sqrt{r}$$

$$\left\{ \begin{array}{l} \frac{-r m}{m^2 - 1} = \sqrt{r} \Rightarrow r m^2 - \sqrt{r} = -r m \Rightarrow \sqrt{r} m^2 + r m - \sqrt{r} = 0 \Rightarrow \\ m^2 + r m - r = 0 \rightarrow m = \frac{-r}{\sqrt{r}}, \frac{1}{\sqrt{r}} \end{array} \right.$$

$$\frac{1}{\sqrt{r}} - \left(-\frac{r}{\sqrt{r}}\right) = \frac{r}{\sqrt{r}} = \frac{r \sqrt{r}}{r}$$

$$\tan\left(\frac{\pi}{2} - \alpha\right) = \frac{1-m}{r+m}, \quad -\frac{r}{r} < \alpha < \frac{r}{r} \Rightarrow -1 < \frac{1-m}{r+m} < 1$$

$$\frac{1-m}{r+m} - 1 < 0 \Rightarrow \frac{1-rm}{r+m} < 0 \Rightarrow \frac{-r}{r+m} < 0$$

$$\frac{1-m}{r+m} + 1 > 0 \Rightarrow \frac{r}{r+m} > 0 \Rightarrow \frac{-r}{r+m} < 0 \Rightarrow m > -\frac{1}{r}$$

$$\tan(\theta_0) \cos(\theta_0) + \tan(\theta_0) \sin(\theta_0) = \left(\frac{-\tan(\theta_0)}{\sqrt{r}} \right) \left(-\frac{\sin(\theta_0)}{\sqrt{r}} \right) + \left(-\frac{\cot(\theta_0)}{\sqrt{r}} \right) \left(\frac{\cos(\theta_0)}{\sqrt{r}} \right) = \frac{r}{r} - \frac{r}{r} = 0$$