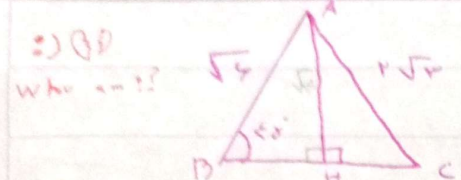


الف) $(\sin 135^\circ + \sin 30^\circ)(\cos 315^\circ - \cos 180^\circ) =$

$$\left(\frac{\sqrt{2}}{2} + \frac{1}{2}\right)\left(\frac{\sqrt{2}}{2} - \left(-\frac{1}{2}\right)\right) = \frac{\sqrt{2} + \sqrt{2}}{2} \times \frac{\sqrt{2} + \sqrt{2}}{2} = \frac{2 + 2}{2} = 2$$

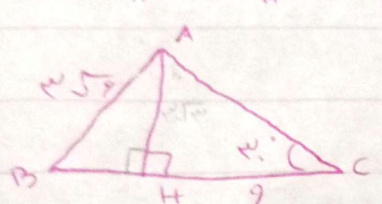
ب) $\frac{1 + 3 \tan^2 45^\circ}{4 \cos^2 45^\circ + 2 \cos^2 225^\circ} = \frac{1 + 3\left(\frac{\sqrt{2}}{2}\right)^2}{4\left(\frac{\sqrt{2}}{2}\right)^2 + 2\left(-\frac{\sqrt{2}}{2}\right)^2} = \frac{1 + 3 \times \frac{2}{4}}{4 \times \frac{2}{4} + 2 \times \frac{2}{4}} = \frac{1 + 1.5}{2 + 1} = \frac{2.5}{3} = \frac{5}{6}$

سوال ۱



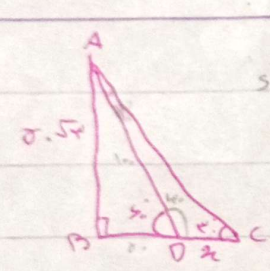
$\sin 45^\circ = \frac{AH}{AB} = \frac{AH}{5} \Rightarrow AH = 5 \sin 45^\circ = \frac{5\sqrt{2}}{2}$

سوال ۲ الف) $HC = ?$



$(5\sqrt{2})^2 - (AH)^2 = HC^2$
 $12 - 3 = HC^2 \Rightarrow HC^2 = 9 \Rightarrow HC = 3$
 $\tan 30^\circ = \frac{AH}{HC} = \frac{3}{9} \Rightarrow AH = 3\sqrt{3}$

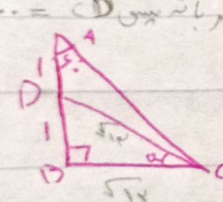
ب) زاویه B = ? $\sin B = \frac{AH}{AB} = \frac{3\sqrt{3}}{5\sqrt{2}} = \frac{\sqrt{6}}{5} \Rightarrow B = 48^\circ$



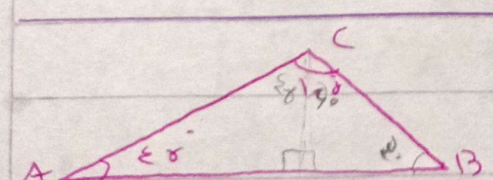
$\sin 60^\circ = \frac{AD}{AB} = \frac{AD}{10} \Rightarrow AD = 10 \sin 60^\circ = 5\sqrt{3}$

سوال ۳ الف) $DC = ?$

$10^2 - (5\sqrt{3})^2 = BD^2$
 $100 - 75 = BD^2 \Rightarrow BD^2 = 25 \Rightarrow BD = 5$
 $\tan 30^\circ = \frac{AD}{DC} = \frac{5\sqrt{3}}{DC} \Rightarrow DC = 5\sqrt{3}$



ب) $\sin \alpha = ?$
 $\cot 50^\circ = \frac{AD}{DC} = \frac{5\sqrt{3}}{DC} \Rightarrow DC = \frac{5\sqrt{3}}{\cot 50^\circ} = 5\sqrt{3} \tan 50^\circ$
 $\sin \alpha = \frac{AD}{AC} = \frac{5\sqrt{3}}{10} = \frac{\sqrt{3}}{2}$



سوال ۴ $\frac{AB}{AC} = ?$

$\frac{CB}{\sin 60^\circ} = \frac{AC}{\sin 40^\circ} = \frac{AB}{\sin 80^\circ}$

$\sin 40^\circ \times \cos 50^\circ + \sin 50^\circ \times \cos 40^\circ = \frac{\sqrt{2}}{2} \times \frac{1}{2} + \frac{\sqrt{2}}{2} \times \frac{1}{2} = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \sqrt{2}$

$\frac{CB}{\frac{\sqrt{2}}{2}} = \frac{AC}{\frac{1}{2}} = \frac{AB}{\frac{\sqrt{2} + \sqrt{2}}{2}}$

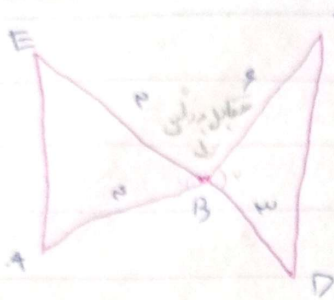
$\frac{\sqrt{2} + \sqrt{2}}{2} AC = \frac{1}{2} AB \Rightarrow \frac{AB}{AC} = \frac{\sqrt{2} + \sqrt{2}}{1} = 2\sqrt{2}$

برگه امتحانی

نام و نام خانوادگی:

موضوع: ریاضیات

نام و نام خانوادگی:



$$\frac{S_{\triangle PBC}}{S_{\triangle ABC}} = \frac{\frac{1}{2} \sin 120^\circ}{\frac{1}{2} \sin 120^\circ} = \frac{1}{9}$$

سوال ۵

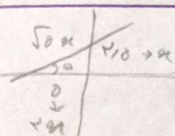
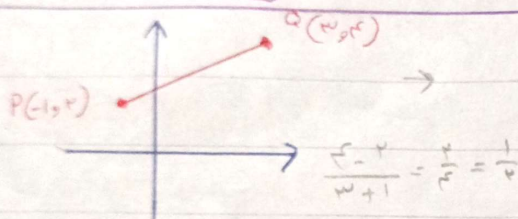


$$S = \frac{1}{2} ab \sin 120^\circ = \frac{1}{2} \cdot 4 \cdot 5 \cdot \frac{\sqrt{3}}{2} = 5\sqrt{3}$$

سوال ۶

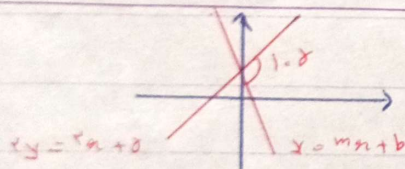


$$S = \frac{1}{2} ab \sin 120^\circ = \frac{1}{2} \cdot 4 \cdot 5 \cdot \frac{\sqrt{3}}{2} = 5\sqrt{3}$$



$$\cos \theta = \frac{1}{\sqrt{5}} = \frac{1}{\sqrt{5}}$$

سوال ۷



$$m = \tan \theta = \sqrt{3}$$

$$b = 0$$

$$m = \tan 120^\circ = -\sqrt{3}$$

$$mb = \frac{0}{1} \times \sqrt{3} = \frac{-\sqrt{3}}{2}$$

سوال ۸

$$\cos(\frac{\pi}{4} + \frac{\pi}{4}) + \sin(\frac{\pi}{4} - \frac{\pi}{4}) - \tan(\frac{\pi}{4} + \frac{\pi}{4}) = 0$$

$$\cos(\frac{\pi}{2}) + \sin(0) - \tan(\frac{\pi}{2}) = 0$$

$$= (\cos 180^\circ) + (-\cos 180^\circ) + (-\cot 180^\circ) = -\frac{\cos 180^\circ}{\sin 180^\circ} = -\frac{1}{0} = -\sqrt{3}$$

سوال ۹

$$\frac{\cos x + \sin x}{-\cos x + \sin x} = \frac{-(-\cos x + \sin x)}{(-\cos x + \sin x)} = -1$$

سوال ۱۰