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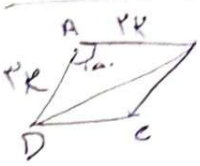
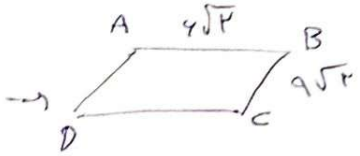
سوال ۱)



$S_{ABCD} = 6\sqrt{2} \div 2 = 2\sqrt{7} \rightarrow$ ساعت مرتب

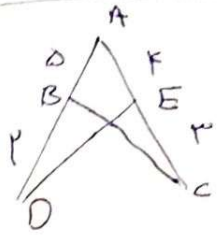
$S_\Delta = \frac{1}{2} AD \times AB \times \sin\hat{A} \Rightarrow 22 = \frac{1}{2} \times 4R^2 \sin 120^\circ = 1.5R^2 = 22$

$R^2 = 18 \rightarrow R = 2\sqrt{6}$ ✓



$P = 2(4\sqrt{2} + 9\sqrt{2}) = 26\sqrt{2}$

سوال ۲)



$S_{ABC} - S_{ADE} = 1,75$

$\tan\hat{A} = ?$

$S_\Delta = \frac{1}{2} \times 7 \times 4 \times \sin A - \frac{1}{2} \times 7 \times 4 \times \sin A = 1,75$

$S_\Delta = \frac{35}{2} \sin A - 14 \sin\hat{A} = 1,75 \Rightarrow \frac{7}{2} = 13.5 \times \sin\hat{A} \rightarrow \sin\hat{A} = \frac{1}{2}$

$\hat{A} = 30^\circ$ یا 150° ← زاویه‌ی داخلی

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

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سوال ۳)

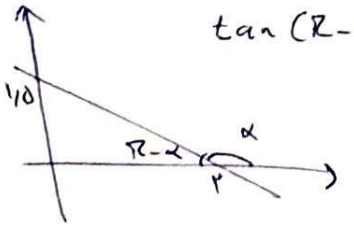
$\frac{|\sin\alpha|}{\cos\alpha} = \frac{-\sin\alpha}{\cos\alpha} \Rightarrow \sin\alpha < 0$

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

$\cos\alpha < 0$ ← ربع سوم بوده ←

✓

سوال ۴)



$\tan(R-\alpha) = \frac{1.5}{2} \rightarrow \tan\alpha = -\frac{3}{4}$

$\Rightarrow \tan\left(\frac{R}{2} - \alpha\right) = \cot\alpha = \frac{1}{\tan\alpha} = \frac{1}{-\frac{3}{4}} = -\frac{4}{3}$

✓

سوال ۵)

$$\frac{3\cos(248^\circ) - 2\sin(158^\circ)}{\sin(20.2^\circ) - \cos(248^\circ)} = \frac{3\cos(90^\circ - 22^\circ) - 2\sin(180^\circ - 22^\circ)}{\sin(180^\circ + 22^\circ) - \cos(270^\circ + 22^\circ)} = ?$$

$$\frac{-3\sin 22^\circ - 2\sin 22^\circ}{-\sin 22^\circ - \sin 22^\circ} = \frac{-5\sin 22^\circ}{-2\sin 22^\circ} = 2,5$$

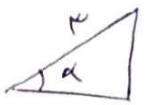
✓

سوال ۶)

$$\frac{\sin\left(\alpha+\frac{\pi}{2}\right)-\sin(\alpha-\pi)}{\left|\tan^2(\alpha)-1\right|}=\frac{\cos\alpha+\sin(\pi-\alpha)}{\left|\tan^2(\alpha)-1\right|}$$

$\sin\alpha$

$\cos\alpha = \frac{2}{3}$ ← نسبت وتر به ضلع مجاور α

$\cos\alpha=\frac{2}{3} \Rightarrow$  $\Rightarrow$ $\begin{cases}\sin\alpha=-\frac{\sqrt{5}}{3}\\ \tan\alpha=-\frac{\sqrt{5}}{2}\end{cases}$

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

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سوال ۷)

$\sin\alpha=2\cos\alpha \longrightarrow \sin^2\alpha+\cos^2\alpha=1 \longrightarrow$

$5\cos^2\alpha=1 \longrightarrow \cos\alpha=\frac{1}{\sqrt{5}} \longrightarrow \cos\alpha=-\frac{\sqrt{5}}{5}$ چون α منفرجه بود

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سوال ۸)

$\alpha=\frac{-2m}{m^2-1}$ $\quad \tan 60^\circ=\sqrt{3}$

$\frac{-2m}{m^2-1}=\sqrt{3} \Rightarrow \sqrt{3}m^2+2m-\sqrt{3}=0$ $\quad \Delta=4-4(\sqrt{3})(-\sqrt{3})=16 \Rightarrow m=\frac{-2\pm\sqrt{16}}{2\sqrt{3}}$

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$\Rightarrow \begin{cases}m=\frac{1}{\sqrt{3}}\\ m=-\frac{3}{\sqrt{3}}\end{cases} \Rightarrow$ اختلاف $=\frac{4}{\sqrt{3}}$

سوال ۹)

$-\frac{\pi}{4}<x<\frac{\pi}{4}$

$-\frac{\pi}{4}<x<\frac{\pi}{4} \xrightarrow{(-1)} -\frac{\pi}{4}<-x<\frac{\pi}{4} \xrightarrow{+\frac{\pi}{4}} 0<\frac{\pi}{4}-x<\frac{\pi}{2}$

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$\Rightarrow \tan\left(\frac{\pi}{4}-x\right)>0 \Rightarrow \frac{1-m}{2+m}>0$

	-2		1	
$1-m$	$+$	$+$	0	$-$
$2+m$	$-$	0	$+$	$+$
$\frac{1-m}{2+m}$	$-$	$\|$	$+$	$-$

$\Rightarrow -2<m<1$

سوال ۱۰)

$\tan(300)\cos(210)+\tan(120)\sin(120)=$

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$\left(-\sqrt{3}\right)\left(-\frac{\sqrt{3}}{2}\right)+\left(-\sqrt{3}\right)\left(\frac{\sqrt{3}}{2}\right)=\frac{3}{2}-\frac{3}{2}=0$