

Date: _____

قسم المذاكرة - قسم المختبر C - تليف سمارت ٢٠

Subject: _____

$$\text{الف) } (\sin 135^\circ + \sin 135^\circ)(\cos 135^\circ - \cos 135^\circ) \quad (1)$$

$$\sin 135^\circ = \sin(90^\circ + 45^\circ) = \sin 90^\circ \cos 45^\circ + \sin 45^\circ \cos 90^\circ =$$

$$1 \times \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \times 0 = \frac{\sqrt{2}}{2} + 0 = \frac{\sqrt{2}}{2}$$

$$\sin 135^\circ = \sin(135^\circ + 135^\circ) = 2 \sin 135^\circ \times \cos 135^\circ = 2 \times \frac{1}{2} \times \left(-\frac{\sqrt{2}}{2}\right) = -\frac{\sqrt{2}}{2}$$

$$\cos 135^\circ = \cos(135^\circ + 45^\circ) = \cos 135^\circ \times \cos 45^\circ - \sin 135^\circ \times \sin 45^\circ =$$

$$0 \times \frac{\sqrt{2}}{2} - (-1) \times \frac{\sqrt{2}}{2} = 0 + \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$$

$$\cos 135^\circ = \cos(90^\circ + 45^\circ) = \cos 90^\circ \cos 45^\circ - \sin 90^\circ \sin 45^\circ =$$

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

$$\left(\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\right) \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} - \frac{2}{4} = \boxed{-\frac{1}{2}}$$

$$\text{ب) } \frac{1 + 3 \tan^2 \pi/4}{\pi \cos^2 \pi/4 + \pi \cos^2 \pi/4}$$

$$\pi \cos^2 \pi/4 + \pi \cos^2 \pi/4$$

$$3 \tan^2 \pi/4 = 3 \left(\frac{1 - \cos^2 \alpha}{1 + \cos^2 \alpha} \right) = 3 \left(\frac{1 - \cos^2 \pi/4}{1 + \cos^2 \pi/4} \right) = 3 \left(\frac{1 - \frac{1}{2}}{1 + \frac{1}{2}} \right)$$

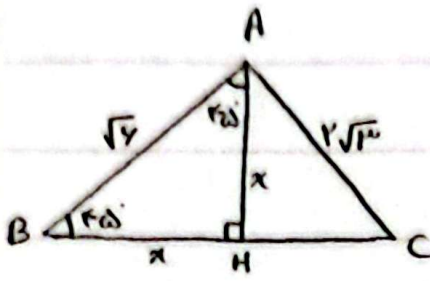
$$3 \left(\frac{\frac{1}{2}}{\frac{3}{2}} \right) = 3 \times \frac{1}{3} = 1$$

$$\pi \cos^2 \pi/4 = \pi \left(\frac{1 + \cos^2 \alpha}{2} \right) = \pi (1 + \cos^2 \pi/4) = \pi (1 + \cos^2 \pi/4) = \pi (1 + \frac{1}{2})$$

$$= \pi \left(\frac{3}{2} \right) = \frac{3\pi}{2}$$

$$\pi \cos^2 \pi/4 = \pi \left(\frac{1 + \cos^2 \alpha}{2} \right) = 1 + \cos^2 \alpha = 1 + \cos^2 \pi/4 = 1 + \cos^2 90^\circ = 1 + 0 = 1$$

$$\frac{1 + 1}{\frac{3\pi}{2} + 1} = \frac{2}{\frac{3\pi}{2} + 1} = \boxed{\frac{1}{\frac{3\pi}{2} + 1}}$$



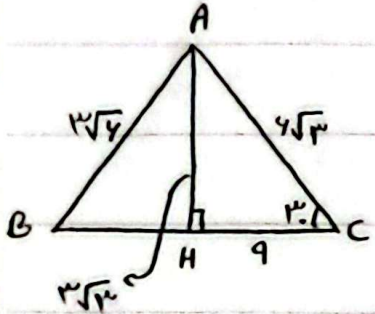
$$x^2 + x^2 = (\sqrt{4})^2 \quad (2)$$

$$2x^2 = 4 \rightarrow x^2 = 2 \rightarrow x = \pm \sqrt{2} \rightarrow x = +\sqrt{2} \quad (\text{الف})$$

لـ مشت را انتخاب می‌کنیم چون در دل یک ضلع بی‌تر از منتهی باشد

$$AH = \sqrt{3} \quad (2\sqrt{3})^2 - (\sqrt{3})^2 = 4x^2 - 3 = 12 - 3 = 9 \rightarrow \sqrt{9} = 3$$

$$\boxed{HC = 3}$$

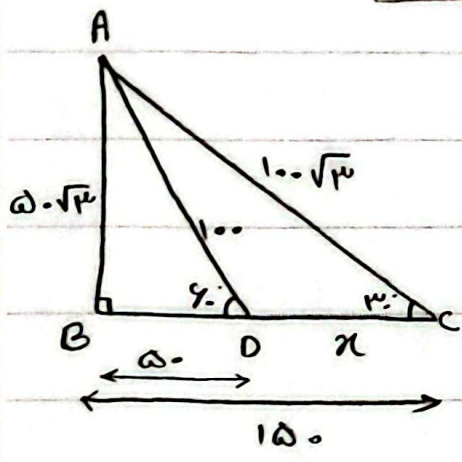


$$\cos 120^\circ = \frac{CH}{AC} = \frac{9}{4\sqrt{3}} = \frac{\sqrt{3}}{4} \rightarrow AC = \frac{1A}{\sqrt{3}} = \frac{1A\sqrt{3}}{3} = 4\sqrt{3} \quad (ب)$$

$$(4\sqrt{3})^2 - 9^2 = 100 - 81 = 19 \rightarrow \sqrt{19} = 3\sqrt{3}$$

$$\sin B = \frac{AH}{AB} = \frac{3\sqrt{3}}{3\sqrt{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \rightarrow \sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\boxed{B = 45^\circ}$$



$$\sin 120^\circ = \frac{AB}{AC} = \frac{5\sqrt{3}}{10\sqrt{3}} = \frac{1}{2} \rightarrow AC = 10\sqrt{3} \quad (\text{الف}) \quad (3)$$

$$(10\sqrt{3})^2 - (5\sqrt{3})^2 = 30000 - 7500 = 22500$$

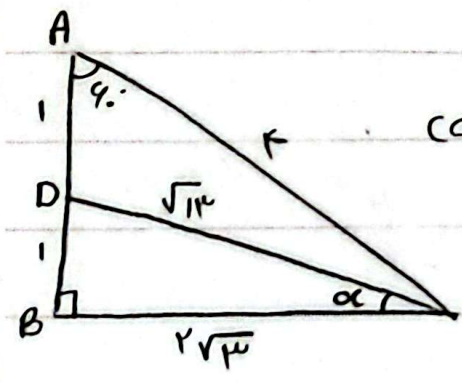
$$\rightarrow \sqrt{22500} = \sqrt{15000} = 150$$

$$\sin 45^\circ = \frac{AB}{AD} = \frac{5\sqrt{3}}{5\sqrt{3}} = \frac{\sqrt{3}}{\sqrt{3}} \rightarrow AD = \frac{10\sqrt{3}}{\sqrt{3}} = 10$$

$$100^2 - (5\sqrt{3})^2 = 10000 - 7500 = 2500$$

$$\rightarrow \sqrt{2500} = \sqrt{5000} = 50$$

$$x = 150 - 50 = 100 \rightarrow \boxed{x = 100}$$

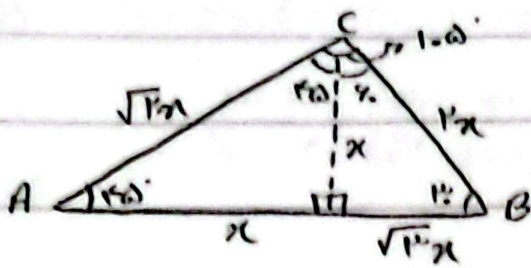


$$\cos 45^\circ = \frac{AB}{AC} = \frac{1}{2} = \frac{1}{2} \rightarrow AC = 2 \quad (ب)$$

$$2^2 - 1^2 = 4 - 1 = 3 \rightarrow \sqrt{3} = \sqrt{4 \times 3} = 2\sqrt{3}$$

$$1^2 + (2\sqrt{3})^2 = 1 + 12 = 13 \rightarrow \sqrt{13}$$

$$\sin \alpha = \frac{1}{\sqrt{13}} \rightarrow \sin \alpha = \boxed{\frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}}$$



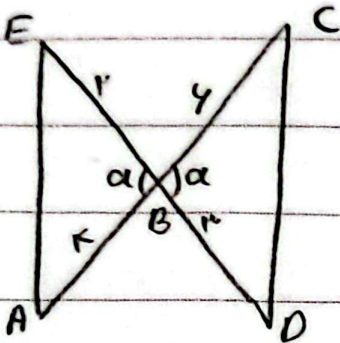
$$(13)^r - x^r = 13x^r - x^r = 12x^r \quad (K)$$

$$\sim \sqrt{12x^r} = \sqrt{12}x$$

$$x^r + x^r = 12x^r \sim \sqrt{12x^r} = \sqrt{12}x$$

$$\frac{AB}{AC} = \frac{x + \sqrt{12}x}{\sqrt{12}x} = \frac{x(1 + \sqrt{12})}{x\sqrt{12}} = \frac{1 + \sqrt{12}}{\sqrt{12}}$$

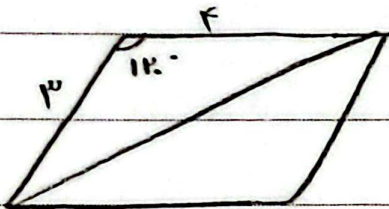
$$\sim \boxed{\frac{AB}{AC} = \frac{1 + \sqrt{12}}{\sqrt{12}} = \frac{\sqrt{12} + \sqrt{12}}{12}}$$



$$S_{ABE} = \frac{1}{2} \times r \times k \times \sin \alpha = k \sin \alpha \quad (a)$$

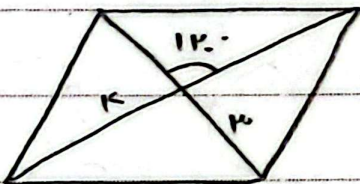
$$S_{BCD} = \frac{1}{2} \times y \times n \times \sin \alpha = y \sin \alpha$$

$$\frac{k \sin \alpha}{y \sin \alpha} = \boxed{\frac{k}{y}}$$



$$\frac{1}{2} \times r \times k \times \sin 120^\circ = \frac{12}{2} \sin 120^\circ = 6 \times \frac{\sqrt{3}}{2} \quad (ج)$$

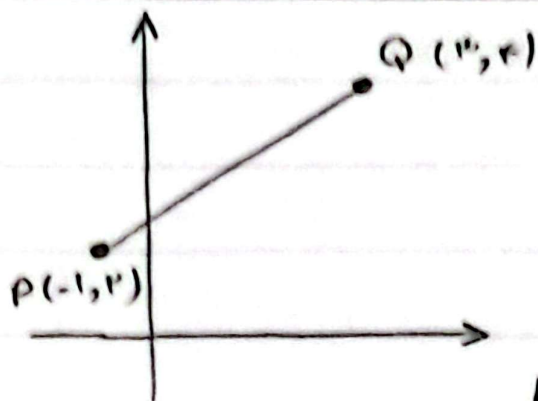
$$= 3\sqrt{3} \times r = \boxed{4\sqrt{3}}$$



$$\frac{1}{2} \times r \times k \times \sin 120^\circ = 6 \times \sin 120^\circ = 6 \times \frac{\sqrt{3}}{2} \quad (د)$$

$$= \boxed{3\sqrt{3}}$$

(مساحة المثلثات EAB و ECD = 3\sqrt{3})



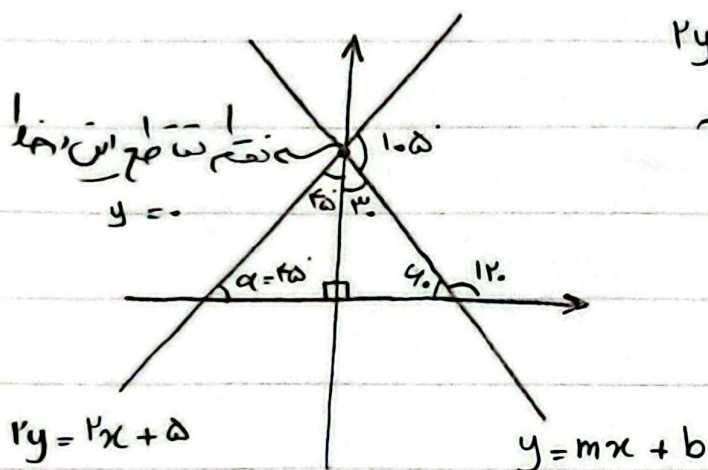
$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{r-r}{r-(-1)} = \frac{r}{r+1} = \frac{r}{r} = 1$$

$$\rightarrow \tan \theta = \frac{1}{r}$$

$$1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} \rightarrow 1 + \frac{1}{r^2} = \frac{1}{\cos^2 \theta} = \frac{\omega}{r}$$

$$\rightarrow \cos^2 \theta = \frac{r}{\omega} \rightarrow \cos \theta = \sqrt{\frac{r}{\omega}} = \frac{r}{\sqrt{\omega}} = \frac{r\sqrt{\omega}}{\omega}$$

$$\boxed{\cos \theta = \frac{r}{\sqrt{\omega}} = \frac{r\sqrt{\omega}}{\omega}}$$



$$ry = rx + \omega \rightarrow y = x + r, \omega$$

$$\rightarrow \tan \alpha = 1 \rightarrow \alpha = \pi/2$$

$$\tan \pi/2 = \frac{\sin \pi/2}{\cos \pi/2} = \frac{\frac{\sqrt{r}}{r}}{-\frac{1}{r}} = -\sqrt{r}$$

$$\hookrightarrow \pi/2 = \left| \frac{-\frac{1}{r}}{\frac{\sqrt{r}}{r}} \right|$$

$$\rightarrow \boxed{m = -\sqrt{r}}$$

$$y = x + r, \omega \rightarrow y = 0 + r, \omega \rightarrow y = \frac{\omega}{r}$$

$$y = -\sqrt{r}x + b \rightarrow \frac{\omega}{r} = -\sqrt{r}x + b \rightarrow \boxed{b = \frac{\omega}{r}}$$

$$\boxed{mb = -\frac{\omega\sqrt{r}}{r} = -r, \omega \sqrt{r}}$$

$$f(x) = \cos(\pi + x) + \sin\left(\frac{\pi}{r} - x\right) - \tan\left(\frac{r\pi}{r} + x\right) \quad (9)$$

$$\cos(\pi + x) = -\cos x$$

$$\sin\left(\frac{\pi}{r} - x\right) = \cos x \quad \rightarrow -\cos x + \cos x + \cot x = \cot x$$

$$\tan\left(\frac{r\pi}{r} + x\right) = -\cot x \quad f(x) = \cot x$$

$$f\left(\frac{\omega\pi}{4}\right) = f(\omega) = \cot \omega = \frac{-\frac{\sqrt{r}}{r}}{\frac{1}{r}} = -\sqrt{r}$$

$$\rightarrow \cot \omega = \boxed{-\sqrt{r}}$$

$$\frac{\sin\left(\frac{14\pi}{r} + x\right) + \cos\left(\frac{1\omega\pi}{r} - x\right)}{\cos(r\pi + x) - \sin(4\pi - x)} \quad (10)$$

$$\sin\left(\frac{14\pi}{r} + x\right) = \sin \frac{14\pi}{r} \cos x + \cos \frac{14\pi}{r} \sin x$$

$$\cos\left(\frac{14\pi}{r}\right) = \cos\left(\frac{14\pi}{r} + \frac{\pi}{r}\right) = \cos\left(1\pi + \frac{\pi}{r}\right) = \cos \frac{\pi}{r} = \cos 90^\circ = 0$$

$$\sin\left(\frac{14\pi}{r}\right) = \sin\left(\frac{14\pi}{r} + \frac{\pi}{r}\right) = \sin\left(1\pi + \frac{\pi}{r}\right) = \sin \frac{\pi}{r} = \sin 90^\circ = 1$$

$$\rightarrow 1 \times \cos x + 0 \times \sin x = \boxed{\cos x}$$

$$\cos(r\pi + x) = \cos(\pi + x) = \boxed{-\cos x}$$

$$\sin(4\pi - x) = \sin(r\pi - x) = \boxed{-\sin x}$$

$$\cos\left(\frac{1\omega\pi}{r} - x\right) = \cos \frac{1\omega\pi}{r} \cos x + \sin \frac{1\omega\pi}{r} \sin x$$

$$\cos \frac{1\omega\pi}{r} = \cos\left(\frac{12\pi}{r} + \frac{r\pi}{r}\right) = \cos(4\pi + \frac{r\pi}{r}) = \cos \frac{r\pi}{r} = 0$$

$$\sin \frac{1\omega\pi}{r} = \sin\left(\frac{12\pi}{r} + \frac{r\pi}{r}\right) = \sin(4\pi + \frac{r\pi}{r}) = \sin \frac{r\pi}{r} = -1$$

$$0 \times \cos x + (-1) \times \sin x = 0 + \sin x = \boxed{-\sin x}$$

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

جواب صحیح