۲۰

نام و نام خانوادگی ..سَنا.بَ.دین........................ پاسخنامه تشریحی تکلیف شماره ..۲.. کلاس دهم ریاضی...............

۱

الف) $(\sin 135° + \sin 300°)(\cos 315° - \cos 150°) = \left(\frac{\sqrt2}{2} + \left(-\frac{\sqrt3}{2}\right)\right)\left(\frac{\sqrt2}{2} - \left(-\frac{\sqrt3}{2}\right)\right) = \left(\frac{\sqrt2-\sqrt3}{2}\right)\left(\frac{\sqrt2+\sqrt3}{2}\right)$

$\to \frac{2}{4} - \frac{3}{4} = \boxed{\frac{-1}{4}}$

ب) $\frac{1+3\tan^2 210°}{4\cos^2 330° + 2\cos^2 225°} = \frac{1+3\left(\frac{\sqrt3}{3}\right)^2}{4\left(\frac{\sqrt3}{2}\right)^2 + 2\left(-\frac{\sqrt2}{2}\right)^2} = \frac{1+1}{3+1} = \frac{2}{4} = \boxed{\frac{1}{2}}$

۲

الف) $\frac{AH}{\sqrt6} = \sin 45° \to \frac{AH}{\sqrt6} = \frac{\sqrt2}{2} \to AH = \sqrt3$, $(HC)^2 = (AC)^2 - (AH)^2 \to (HC)^2 = 12 - 3 = 9$

$\to \boxed{HC = 3}$

ب) $\frac{HC}{AC} = \sin 60° \to \frac{9}{AC} = \frac{\sqrt3}{2} \to AC = 6\sqrt3$, $\frac{AH}{AC} = \sin 30° \to \frac{AH}{6\sqrt3} = \frac{1}{2} \to AH = 3\sqrt3$

$(BH)^2 = (AB)^2 - (AH)^2 \to (BH)^2 = 54 - 27 = 27 \to BH = 3\sqrt3 \to BH = AH$, $\hat H = 90°$

$\to \hat B = \hat A' = 45° \to \boxed{\hat B = 45°}$

۳

الف) $\frac{AB}{AC} = \sin 30° \to \frac{50\sqrt3}{AC} = \frac{1}{2} \to AC = 100\sqrt3$, $(BC)^2 = (AC)^2 - (AB)^2 = 30000 - 7500$

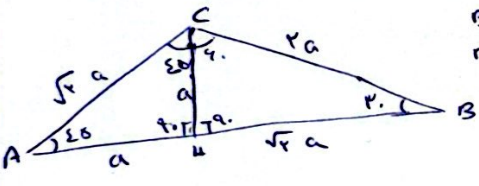
$= 22500 \to BC = 150$, $\frac{BD}{AB} = \cot 60° \to \frac{BD}{50\sqrt3} = \frac{\sqrt3}{3} \to BD = 50$ / $x = BC - BD = 150 - 50$

$\to \boxed{x = 100}$

ب) $AC \to$ ضلع روبه‌رو به زاویه $30°$ $\to AC = 4$, $(BC)^2 = (AC)^2 - (AB)^2 = 16 - 4 = 12 \to BC = 2\sqrt3$

$\cot\alpha = 2\sqrt3 \to 1 + \cot^2\alpha = \frac{1}{\sin^2\alpha} \to 1 + 12 = \frac{1}{\sin^2\alpha} \to \boxed{\sin\alpha = \frac{\sqrt{13}}{13}}$

۴



$BC = a \times 2 = 2a$

$BH = \frac{\sqrt3}{2} \times 2a = \sqrt3\, a$

$a^2 + a^2 = 2a^2 = AC^2 \to AC = \sqrt2\, a$

$\frac{AB}{AC} = \frac{a + \sqrt3\, a}{\sqrt2\, a} = \boxed{\frac{\sqrt2 + \sqrt6}{2}}$

۵

$\frac{S_{\triangle ABE}}{S_{\triangle BCD}} = \frac{\frac12 \times 2 \times 4 \times \sin\hat B}{\frac12 \times 3 \times 6 \times \sin\hat B} = \boxed{\frac{4}{9}}$

۶

الف) $\frac{1}{2} \times \frac{1}{2} \times ab \times \sin 120^\circ = 2 \times 2 \times \frac{\sqrt{3}}{2} = \boxed{4\sqrt{3}}$

ب) $S = 4 \times \frac{1}{2} \times 4 \times \sin 120^\circ = \boxed{4\sqrt{3}}$

۷

$y = ax + b \rightarrow \begin{cases} 4 = 2a + b \\ -2 = 0 \cdot a + b \end{cases}$

$6 = 4a \rightarrow a = \frac{1}{2}$, $\tan\theta = \frac{1}{2}$

$\tan^2\theta + 1 = \frac{1}{\cos^2\theta} \rightarrow \frac{1}{4} + 1 = \frac{1}{\cos^2\theta} \rightarrow \cos^2\theta = \frac{4}{5} \rightarrow \cos\theta = \pm \frac{2}{\sqrt{5}}$

نظر متدار $\frac{2}{\sqrt{5}}$ درست است زیرا θ حاده و در ناحیه اول است.

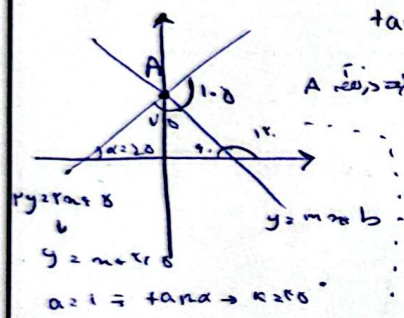
۸

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

A روی $y = x + 2/5$ است $\xrightarrow{x=0}$ $y = 0 + 2/5 \rightarrow y = 2/5$

$y = -\sqrt{3}x + b \xrightarrow{\substack{y=2/5 \\ x=0}} 2/5 = 0 + b \rightarrow b = 2/5$

$mb = -\sqrt{3} \times 2/5 = \boxed{\frac{-5\sqrt{3}}{2}}$



۹

$f(x) = -\cos(x) + \cos(x) - (-\cot(x)) = \cot x$

$f\left(\frac{5\pi}{4}\right) = \cot\left(\frac{5\pi}{4}\right) = \boxed{-\sqrt{3}}$

$\left(\frac{5\pi}{4} = 180^\circ\right)$

۱۰

$$\frac{\sin\left(\frac{17\pi}{2} + x\right) + \cos\left(\frac{15\pi}{2} - x\right)}{\cos(4\pi + x) - \sin(4\pi - x)} = \frac{\sin\left(\frac{\pi}{2} + x\right) + \cos\left(\frac{3\pi}{2} - x\right)}{\cos(\pi + x) - \sin(2\pi - x)}$$

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