بهار شناس ۲۰ تکلیف شماره ۱۸ کلاس دهم [redacted]

۱- الف) $\tan\frac{11\pi}{4} + \sin\frac{15\pi}{4}\cos\frac{13\pi}{4}$

$\left(\frac{12\pi}{4}-\frac{\pi}{4}\right) \quad \left(\frac{16\pi}{4}-\frac{\pi}{4}\right) \quad \left(\frac{12\pi}{4}+\frac{\pi}{4}\right)$

$\tan\left(-\frac{\pi}{4}\right) + \sin\left(-\frac{\pi}{4}\right) \times \cos\left(\frac{5\pi}{4}\right)$

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

ب) $\tan\frac{17\pi}{6}\sin\frac{11\pi}{3} + \cos\frac{10\pi}{3}$

$\left(\frac{18\pi}{6}-\frac{\pi}{6}\right) \quad \left(\frac{12\pi}{3}-\frac{\pi}{3}\right) \quad \left(\frac{9\pi}{3}+\frac{\pi}{3}\right)$

$-\tan\left(\frac{\pi}{6}\right) \times \sin\left(-\frac{\pi}{3}\right) + \cos\left(\frac{4}{3}\pi\right)$

$\left(-\frac{\sqrt{3}}{3} \times -\frac{\sqrt{3}}{2}\right) - \frac{1}{2} = \frac{1}{2} - \frac{1}{2} = \boxed{0}$

۲- $\cot x = 4$

$\dfrac{\frac{3\cos x}{\sin x} - \frac{\sin x}{\sin x}}{\frac{\cos x}{\sin x} + \frac{\sin x}{\sin x}} = \dfrac{3\cot x - 1}{\cot x + 1} = \boxed{\frac{11}{5}}$

۳- $\sin a = 2\cos a$ در ربع سوم، $\cos a$ ؟

یا $\tan a = \frac{\sin a}{\cos a} = 2$

$\tan^2 a + 1 = \frac{1}{\cos^2 a} \qquad 5 = \frac{1}{\cos^2 a}$

$\Rightarrow \cos^2 a = \frac{1}{5}$

$\Rightarrow \boxed{\cos a = -\frac{\sqrt{5}}{5}}$

۴- الف) a در ربع ۲ و $\sin a = \frac{\sqrt{2}}{10}$ مفروض، $\cos\left(\frac{11\pi}{4}+a\right)$ ؟

$\frac{11\pi}{4} = \frac{8\pi}{4} + \frac{3\pi}{4} + a$

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

$\Rightarrow \cos\alpha = -\frac{\sqrt{98}}{10} = -\frac{7\sqrt{2}}{10}$

طبق فرمول

$\cos\left(\frac{3\pi}{4}+a\right) = \cos\frac{3\pi}{4}\cos a - \sin\frac{3\pi}{4}\sin a$

$= \left(-\frac{\sqrt{2}}{2}\right) \times \left(-\frac{7\sqrt{2}}{10}\right) - \left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10}\right)$

$= \frac{7}{10} - \frac{1}{10} = \frac{6}{10} = \boxed{\frac{3}{5}}$

ب) a در ربع ۱ و $\tan a = \frac{1}{7}$ مفروض، $\sin\left(\frac{13\pi}{4}+a\right)$ ؟

$\left(\frac{5\pi}{4}+a\right)$

داریم $\tan^2\alpha + 1 = \frac{1}{\cos^2\alpha}$

$\cos^2\alpha = \frac{49}{50}$

$\Rightarrow \cos\alpha = \frac{7}{5\sqrt{2}}$

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

$\Rightarrow \sin\alpha = \frac{1}{5\sqrt{2}}$

طبق فرمول

$\sin\left(\frac{5\pi}{4}+a\right) = \sin\frac{5\pi}{4} \times \cos a + \sin a \times \cos\frac{5\pi}{4}$

$= \left(-\frac{\sqrt{2}}{2} \times \frac{7}{5\sqrt{2}}\right) + \frac{1}{5\sqrt{2}} \times -\frac{\sqrt{2}}{2}$

$= -\frac{7}{10} - \frac{1}{10} = -\frac{8}{10} = \boxed{-\frac{4}{5}}$

۵- اگر $\frac{2\sin^2 x}{\cos^2 x} + \frac{\cos^2 x}{\cos^2 x} = \frac{\frac{4}{3}}{\cos^2 x}$ حاصل $\tan^2 x$ ؟

$2\tan^2 x + 1 = \frac{4}{3}(1+\tan^2 x)$

$2\tan^2 x + 1 = \frac{4}{3} + \frac{4}{3}\tan^2 x$

$\frac{2}{3}\tan^2 x = \frac{1}{3} \Rightarrow \boxed{\tan^2 x = \frac{1}{2}}$

$\frac{1}{2}$

$\frac{1}{2} \times 6 \times \sqrt{3} \times \sin a = \frac{9}{2} \Rightarrow \sin a = \frac{\sqrt{3}}{2} \Rightarrow a = 60, 120$ —۶

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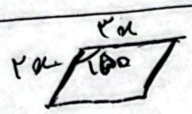

$2x \times 3x \times \underbrace{\sin 150°}_{\frac{1}{2}} = 3x^2 = 54 \Rightarrow x^2 = 18$

$\Rightarrow x = 3\sqrt{2}$

$S = 54$

$P = ?\ 10x = \boxed{30\sqrt{2}}$

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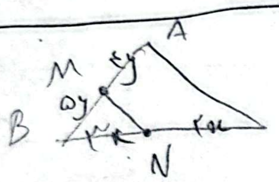
$S_{ABC} - S_{ADE} = \frac{1}{2} \times 5 \times 7 \times \sin\hat{A} - \frac{1}{2} \times 7 \times 4 \times \sin\hat{A} = (\frac{35}{2} - \frac{28}{2})(\sin\hat{A}) = 1/75$

$\frac{7}{2}\sin\hat{A} = \frac{7}{4} \Rightarrow \sin\hat{A} = \frac{1}{2}$

$\Rightarrow \hat{A} = \frac{\pi}{6}$ چون $\hat{A}$ حاده است $\Rightarrow \boxed{\tan\hat{A} = \frac{\sqrt{3}}{3}}$

.۹ $?\ \frac{BM}{AM}$



$2\underbrace{BN}_{3x} = 3\underbrace{NC}_{2x}$

$\frac{S_{ABC}}{S_{BMN}} = \frac{AB \times \overset{5x}{BC} \times \overset{1}{\sin B}}{BM \times \underset{3x}{BN} \times \underset{1}{\sin B}} = \frac{5}{3} \times \frac{AB}{BM} = 3 \Rightarrow \frac{AB}{BM} = \frac{9}{5}$

$\Rightarrow \frac{BM}{AB} = \frac{5}{9}$

$BM = 5y$
$AB = 9y \Rightarrow AM = 4y$

$\Rightarrow \frac{BM}{AM} = \frac{5y}{4y} = \boxed{\frac{5}{4}}$

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$\frac{1}{\sqrt{\cos^2 a}} - \tan a = \frac{1 + \sin a}{\cos a} \Rightarrow \frac{1 - 1 - \sin a}{|\cos a|} = \tan a = \frac{\sin a}{\cos a}$

$\sqrt{\cos^2 a} \Leftarrow |\cos a|$

$\frac{-\sin a}{|\cos a|} \Rightarrow \boxed{\cos a < 0}$

$\frac{|\sin a|}{\cos a} = -\frac{1}{\cot a} = -\tan a$

در نتیجه در ناحیه سوم

$\frac{|\sin a|}{\cos a} = -\tan a \Rightarrow \boxed{\sin a < 0}$