1) الف) «حسین لطیفی»

$\frac{77}{180} = \frac{Rad}{\pi} \Rightarrow 77^\circ = \frac{77}{180}\pi Rad$

ب) $\frac{132}{180} = \frac{Rad}{\pi} \Rightarrow 132^\circ = \frac{132}{180}\pi Rad$

ج) $\frac{\frac{5\pi}{12}}{\pi} = \frac{x}{180} \Rightarrow x = \frac{5\times 180}{12} = 75^\circ$

د) $\frac{\frac{4\pi}{9}}{\pi} = \frac{x}{180} \Rightarrow x = 80^\circ$

---

2)

$\frac{\frac{132a}{9}}{\frac{100}{8}} = \frac{x}{180} \Rightarrow x = \frac{a\times 180}{72} = 2.5a$

$x + y + 10a = 180^\circ \Rightarrow$

$2.5a + 10a + 10a = 180^\circ \Rightarrow 22.5a = 180^\circ$

$a \simeq 8^\circ$

$\frac{a\pi}{8} = \frac{y}{180} \Rightarrow y = 10a$

---

3) الف)

$-\tan 45^\circ + 2\cot 45^\circ = \cot 45^\circ$

$\frac{1}{2}\times\frac{\sqrt{3}}{2} - \left(\frac{\sqrt{3}}{2}\times\frac{1}{2}\right) + 1 = \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4} + 1 = 1$

ب)

$\frac{\frac{1}{2}+1+2}{\sqrt{3}-\frac{\sqrt{3}}{3}} = \frac{\frac{13}{3}}{\frac{2\sqrt{3}}{3}} = \frac{13}{2}\sqrt{3}$

---

4)

$-\sin^2 30^\circ + \sin^2 60^\circ = \sin^2\theta \Rightarrow -\frac{1}{4} + \frac{3}{4} = \sin^2\theta \Rightarrow$

$\sin^2\theta = \frac{2}{4} \Rightarrow \sin\theta = \pm\frac{\sqrt{2}}{2}$

چون زاویه حاده است $\rightarrow \theta = 45^\circ$

$\tan 45^\circ = 1$

---

5)

$\tan\theta = \frac{\frac{2}{\sqrt{3}}\left(\frac{2}{3}\right)}{\frac{4}{9}} = \frac{2}{3}\times\frac{3}{\sqrt{3}} = \sqrt{3} \xrightarrow{\text{زاویه حاده}} \theta = 60^\circ$

$\frac{60}{180} = \frac{Rad}{\pi} \Rightarrow 60^\circ = \frac{\pi}{3} Rad$

---

6)

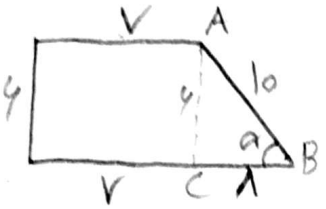
$\tan^2\theta + 1 = \frac{1}{\cos^2\theta} \Rightarrow 2^2 + 1 = \frac{1}{\cos^2\theta} \Rightarrow \cos^2\theta = \frac{1}{5} \Rightarrow \cos\theta = \pm\frac{1}{\sqrt{5}}$

$\sin^2\theta = 1 - \cos^2\theta \Rightarrow \sin^2\theta = 1 - \frac{1}{5} \Rightarrow \sin\theta = \pm\frac{2}{\sqrt{5}}$

$\sin\theta = 2\cos\theta$ (باجفت مثبت باجفت مثبت)

$\frac{12\cos\theta - \cos\theta}{8\cos\theta - 4\cos\theta} = \frac{11\cos\theta}{\cos\theta} = 11$

(7)



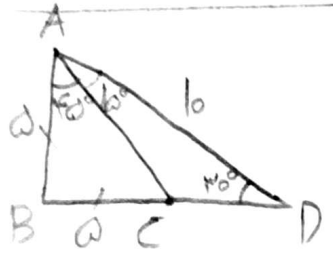
$\sin\alpha = 0/۶$

$\sin\alpha = \frac{AC}{AB} \Rightarrow \frac{۶}{۱۰} = \frac{۶}{AB} \Rightarrow AB = ۱۰$

$\triangle ABC$ طول اضلاع مثلث طلایی $\longrightarrow$ ضربی از طول اضلاع مثلث طلایی $\longrightarrow BC = ۸$ $\quad P_{\text{ذوزنقه}} = ۶+۷+۱۵+۱۰ =$ ۳۸

---

(8)



$\sin ۳۰^\circ = \frac{۱}{۲} = \frac{AB}{۱۰} \Rightarrow AB = ۵ \longrightarrow AB = BC \Rightarrow BC = ۵$

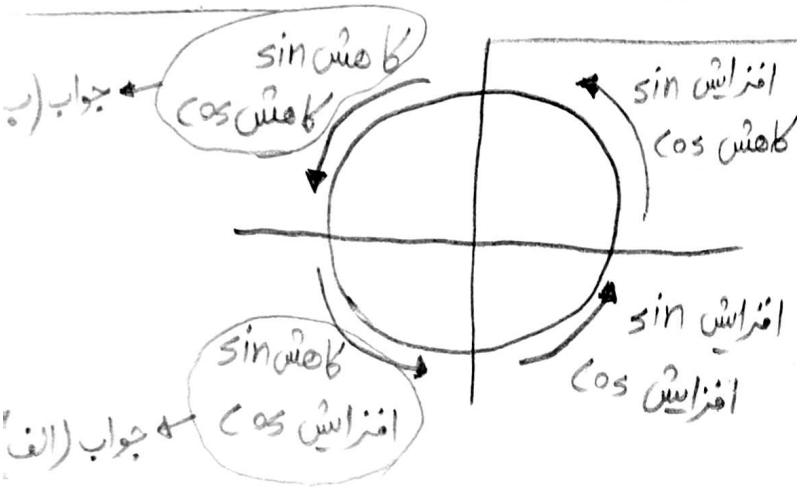
$\sin ۶۰^\circ = \frac{\sqrt{۳}}{۲} = \frac{BD}{۱۰} \Rightarrow BD = ۵\sqrt{۳} \quad DC = ۵\sqrt{۳} - ۵$

---

(9)

الف) ناحیه ۳

ب) ناحیه ۲



---

(10)

$\tan^۲x + ۱ = \frac{۱}{\cos^۲x} \Rightarrow \frac{۹}{۱۰} = \cos^۲x \Rightarrow \cos x \underset{\cos x < ۰}{\overset{\text{ناحیه ۳}}{=}} -\frac{۳}{\sqrt{۱۰}}$

$\sin^۲x = ۱ - \cos^۲x \Rightarrow \sin^۲x = \overbrace{۱ - \frac{۹}{۱۰}}^{\frac{۱}{۱۰}} \Rightarrow \sin x \underset{\sin x < ۰}{\overset{\text{ناحیه ۳}}{=}} -\frac{۱}{\sqrt{۱۰}}$