محمد شیرازی ۹۹/۱۳

-۱

$3x$, 30°, $2x$ ⇒ $2x \times 3x \times \frac{1}{2} = 54 \rightarrow x = 3\sqrt{2}$

(متوازی الاضلاع) محیط $= 2x+2x+3x+3x = 10x$ $\Big\}$ $\boxed{2P = 30\sqrt{2}}$

-۲

$S_{A\hat{B}C} = 5 \times 7 \times \frac{1}{2} \times \sin\hat{A} = 17{,}5 \sin\hat{A}$

$S_{A\hat{D}E} = 4 \times 7 \times \frac{1}{2} \times \sin\hat{A} = 14 \sin\hat{A}$ $\Big\}$ $S_{A\hat{B}C} - S_{A\hat{D}E} = 3{,}5 \sin\hat{A} = 1{,}75$

$\sin\hat{A} = \frac{1}{2} \Rightarrow \boxed{\hat{A} = 30^\circ}$ $\rightarrow \boxed{\tan\hat{A} = \tan 30^\circ = \frac{\sqrt{3}}{3}}$

$\frac{1}{2} \times \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

-۳

if $\cos a > 0 \Rightarrow \frac{1}{\cos a} - \frac{\sin a}{\cos a} = \frac{1-\sin a}{\cos} \neq \frac{1+\sin a}{|\cos a|}$

$\cos a < 0 \Rightarrow \frac{-1}{\cos a} - \frac{\sin a}{\cos a} = \frac{-1-\sin a}{\cos a} = \frac{1+\sin a}{|\cos a|}$ ✓ $\Rightarrow \boxed{\cos a < 0}$

if $\sin a > 0 \Rightarrow \frac{\sin a}{\cos a} \neq \frac{-\sin a}{\cos a}$

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

→ ناحیه سوم

-۴

$\tan(\frac{\pi}{2} - a) = \cot\hat{a}$

$f(x) = ax + b \rightarrow \boxed{b = 1{,}5}$

$x=2 \downarrow$

$2a + 1{,}5 = 0$

$\boxed{a = -\frac{3}{4} = \tan\hat{a}}$

$\boxed{\cot\hat{a} = -\frac{4}{3}}$

-۵

$\cos 248^\circ = \cos(\frac{3\pi}{2} - 22) = -\sin 22$

$\sin 158^\circ = \sin(\pi - 22) = \sin 22^\circ$

$\sin 202^\circ = \sin(\pi + 22) = -\sin 22^\circ$

$\cos 292^\circ = \cos(\frac{3\pi}{2} + 22) = \sin 22^\circ$ $\Bigg\}$ $\frac{-2\sin 22^\circ - 2\sin 22^\circ}{-\sin 22^\circ - \sin 22^\circ} = 2{,}5$

-۶

ناحیه ۴ ⟸ $a \Rightarrow \cos a > 0$, $\underline{\sin a < 0}$

$\sin(\frac{\pi}{2} + a) = \cos a$

$-\sin(a - \pi) = \sin(\pi - a) = \sin a$

$1 + \tan^2 a = \frac{1}{\cos^2 a} \Rightarrow 1 + \tan^2 a = \frac{9}{4} \rightarrow \tan^2 a = \frac{5}{4} \rightarrow \tan^2 a - 1 = \frac{1}{4}$

$\sin^2 a + \cos^2 a = 1 \rightarrow \sin^2 a = \frac{5}{9} \rightarrow \sin = -\frac{\sqrt{5}}{3}$ $\Bigg\}$ $4(\cos a + \sin a) = \frac{8 - 4\sqrt{5}}{3}$

-۷

$\sin^2 a + \cos^2 a = 1 \xrightarrow{\sin a = 2\cos a} 5\cos^2 a = 1 \rightarrow \cos a = \frac{-\sqrt{5}}{5}$, $\sin a = \frac{-2\sqrt{5}}{5}$

-۸

$(m^2-1)y = -2mx + 2 \rightarrow y = \frac{-2mx}{m^2-1} + \frac{2}{m^2-1} \Rightarrow \frac{-2m}{m^2-1} = \sqrt{3} \Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} \rightarrow S = \frac{-2}{\sqrt{3}}, P = -1$

یعنی شیب خط $\sqrt{3}$ است زاویه 60° می‌سازد

$\hookrightarrow \sqrt{S^2 - 4P} = \sqrt{\frac{4}{3} + 4} = \frac{4\sqrt{3}}{3}$

-۹

$\tan(\frac{\pi}{4} - x) = \frac{1 - \tan x}{1 + \tan x}$

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

$\rightarrow -1 < \tan x < 1$ $\Bigg\}$

$0 < 1 - \tan x < 2 \rightarrow 0 < 1 - m < 2 \rightarrow -1 < m < 1$

$0 < 1 + \tan x < 2 \rightarrow 0 < 2 + m < 2 \rightarrow -2 < m < 0$ $\Big\}$ $\xrightarrow{\cup} \boxed{-2 < m < 1}$

-۱۰

$\tan 300^\circ = \tan(\frac{3\pi}{2} + 30) = -\cot 30^\circ = -\sqrt{3}$

$\cos 210^\circ = \cos(\pi + 30) = -\cos 30^\circ = -\frac{\sqrt{3}}{2}$

$\tan 480^\circ = \tan 120^\circ = \tan(\frac{\pi}{2} + 30^\circ) = -\cot 30^\circ = -\sqrt{3}$

$\sin 840 = \sin 120^\circ = \sin(\frac{\pi}{2} + 30) = \cos 30 = \frac{\sqrt{3}}{2}$ $\Bigg\}$ $\underbrace{-\sqrt{3} \times -\frac{\sqrt{3}}{2}}_{+\frac{3}{2}} + \underbrace{-\sqrt{3} \times \frac{\sqrt{3}}{2}}_{-\frac{3}{2}} = 0$

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finish