Solucions examen 5

1.- Siguin sinx=$\frac{3}{4}$ amb 90^o<x<180^o i tagy=5 180^o<y<270^o. Calcula: sin(180-(x)), cos(x+y), tag(x-y), sin(2x)

En efecte,

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

$$\frac{9}{16} + \cos^2 x = 1$$

$$\cos^2 x = 1 - \frac{9}{16} = \frac{7}{16}$$

$$\cos x = -\sqrt{\frac{7}{16}} = -\frac{\sqrt{7}}{4}$$

$$\left\{ \begin{array}{c} \frac{\sin y}{\cos y} = 5 \\ \sin^2 y + \cos^2 y = 1 \end{array} \right. \rightarrow \left\{ \begin{array}{c} \sin y = 5\cos y \\ \sin^2 y + \cos^2 y = 1 \end{array} \right.$$

$$25\cos^2 y + \sin^2 y = 1$$

$$26\cos^2 y = 1$$

$$\begin{aligned} \cos y &= \sqrt{\frac{1}{26}} = \frac{1}{\sqrt{26}} \\ \sin y &= \frac{5}{\sqrt{26}} \end{aligned}$$

Aleshores,

sin(180-(x))=sinx=$\frac{3}{4}$

cos(x+y)=cosx·cosy-sinx·siny=$-\frac{\sqrt{7}}{4}\cdot(\frac{1}{\sqrt{26}}) - \frac{3}{4}\cdot(\frac{5}{\sqrt{26}}) = \frac{-\sqrt{7}-15}{4\sqrt{26}}$

tag(x-y)=$\frac{\sin(x-y)}{\cos(x-y)} = \frac{\sin x\cdot\cos y - \cos x\cdot\sin y}{\cos x\cdot\cos y + \sin x\cdot\sin y} = \frac{\frac{3}{4}\cdot\frac{1}{\sqrt{26}} - (-\frac{\sqrt{7}}{4})\frac{5}{\sqrt{26}}}{-\frac{\sqrt{7}}{4}\cdot(\frac{1}{\sqrt{26}}) + \frac{3}{4}\cdot(\frac{5}{\sqrt{26}})} = \frac{\frac{3+5\sqrt{7}}{4\sqrt{26}}}{\frac{-\sqrt{7}+15}{4\sqrt{26}}} = \frac{3+5\sqrt{7}}{-\sqrt{7}+15}$

sin2x=2sinxcosx=$2\frac{3}{4}(-\frac{\sqrt{7}}{4}) = \frac{-6\sqrt{7}}{16} = \frac{-3\sqrt{7}}{8}$

2.- *Resol en triangle que mesura a=5cm, A=35º, B=50º. Quina és l' àrea d' aquest triangle?*

En efecte,

$$C = 180 - 35 - 50 = 95^o$$

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$$\frac{5}{\sin 35} = \frac{b}{\sin 50} \rightarrow b = \frac{5 \sin 50}{\sin 35} = 6,67cm$$

$$\frac{5}{\sin 35} = \frac{c}{\sin 95} \rightarrow c = \frac{3 \sin 95}{\sin 35} = 5,21cm$$

D' altra banda l' àrea val,

$$A = \frac{ab \sin C}{2} = \frac{5 \cdot 6,67 \cdot \sin 95}{2} = 16,61cm^2$$

3.- *Resol les equacions:*

a) $sinx=-0,9$

b) $cos3x= 0,1$

En efecte,

$$sinx = -0,9$$

$$64,15^o$$

$$x = (180 + 64,16) + 360k = 244,16 + 360K$$

$$x = (360 - 64,15) + 360k = 295,84 + 360K$$

$$cos3x = \ 0,1$$

$$3x = 84,26 + 360K \rightarrow x = \frac{84,26 + 360K}{3}$$

$$3x = (360 - 84,26) + 360K \rightarrow x = \frac{275,74 + 360K}{3}$$

4.- *Demostra la identitat*

$$taga - tagb = \frac{\sin(a-b)}{\cos a \cos b}$$

En efecte,

- $\frac{\sin(a-b)}{\cos a \cos b} = \frac{\sin a \cdot cosb - sinb \cdot cosa}{\cos a \cos b} = \frac{\sin a \cos b}{\cos a \cos b} - \frac{\sin b \cos a}{\cos a \cos b} = \frac{\sin a}{\sin b} - \frac{\sin b}{\cos b} = \tan a - \tan b$

5.- *Dos pobles estan separats per 500 m. Un avió està volant entre aquests dos pobles de tal manera que el poble A el veu segons un angle de 30º i des del B segons un angle de 80º. A quina alçada vola l'avió?*

En efecte,

$$\frac{500}{\sin 70} = \frac{b}{\sin 30} \rightarrow \ b = \frac{500 \sin 30}{\sin 70} = 266$$

$$\sin 80 = \frac{h}{266} \rightarrow h = 266 \sin 80 = 262m$$