2ªEVALUACIÓN :1ªparte (Trigonometría y Geometría) **3-2-2017**

Nombre y Apellidos : CORRECCIÓN Curso: 4º B

1- Sabiendo que cosec $\alpha = -\sqrt{\frac{3}{2}}$, con $\pi < \alpha < \frac{3\pi}{2}$ .Se pide: a) Hallar sen α cos α y tag α

b) Representa sobre lacircunferencia y calcula sen (180^0- α) ; cos (-α) ; cos (90^0- α) tag (180^0+ α)

(a) $\text{sen}\,\alpha = -\sqrt{\frac{2}{3}} = -\frac{\sqrt{6}}{3}$

$\text{tag}\,\alpha = \frac{\text{sen}\,\alpha}{\cos\alpha}$

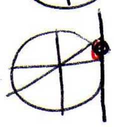
$\cos^2\alpha = 1 - \left(-\frac{\sqrt{6}}{3}\right)^2 = 1 - \frac{6}{9} = \frac{3}{9} = \frac{1}{3} \Rightarrow \cos\alpha = \cancel{\pm}\,-\frac{\sqrt{3}}{3}$ III cuad

$\text{tag}\,\alpha = -\frac{\sqrt{6}}{3} : \left(-\frac{\sqrt{3}}{3}\right) = +\frac{3\sqrt{6}}{3\sqrt{3}} = \sqrt{2}$

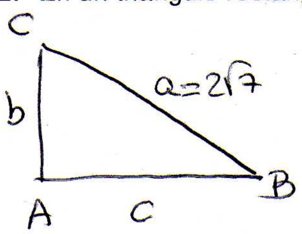
(b) $\text{sen}(180^o - \alpha) =$  $= \text{sen}\,\alpha = -\frac{\sqrt{6}}{3}$

$\cos(-\alpha) =$  $= \cos\alpha = -\frac{\sqrt{3}}{3}$

$\cos(90^o - \alpha) =$  $= \text{sen}\,\alpha = -\frac{\sqrt{6}}{3}$

$\text{tg}(180^o + \alpha) =$  $= \text{tg}\,\alpha = \sqrt{2}$

2.- En un triángulo rectángulo, recto en A. Se conoce tag B = $\frac{\sqrt{5}}{3}$ y a= $2\sqrt{7}$. Se pide: **b, c, cosC**



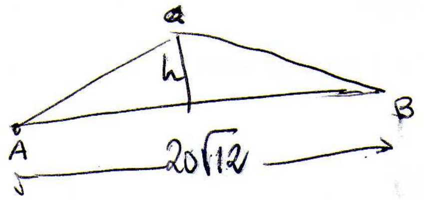
Apartado

$1 + \text{tg}^2 B = \frac{1}{\cos^2 B} \Rightarrow 1 + \left(\frac{\sqrt{5}}{3}\right)^2 = \frac{1}{\cos^2 B} \Rightarrow 1 + \frac{5}{9} = \frac{1}{\cos^2 B} \Rightarrow$

$\Rightarrow \cos^2 B = \frac{9}{14} \Rightarrow \cos B = \cancel{\pm}\frac{3}{\sqrt{14}} = \frac{3\sqrt{14}}{14}$

- $\cos\hat{B} = \frac{c}{a} \Rightarrow \frac{3\sqrt{14}}{14} = \frac{c}{2\sqrt{7}} \Rightarrow c = \frac{6\cdot\sqrt{14}\cdot\sqrt{7}}{14} = \frac{6\cdot 7\sqrt{2}}{14} \Rightarrow c = 3\sqrt{2}$
- $\text{tg}\,\hat{B} = \frac{b}{c} \Rightarrow \frac{\sqrt{5}}{3} = \frac{b}{3\sqrt{2}} \Rightarrow b = 3\sqrt{2}\cdot\frac{\sqrt{5}}{3} = \sqrt{10}$
- $\cos\hat{C} = \frac{c}{a} \Rightarrow \cos\hat{C} = \frac{\sqrt{10}}{2\sqrt{7}} = \frac{\sqrt{70}}{14}$

3.- Dos observadores A y B, están situados a distintos lados de la vertical de un objeto volador. Determinar la altura de dicho objeto, simplificada y racionalizada al máximo. Sabiendo que $A=\frac{\pi}{3}$; $tagB=\frac{5}{2}\sqrt{6}$ y la distancia entre ellos es : $20\sqrt{12}$



$$\left.\begin{array}{l} tg\,60^\circ = \dfrac{h}{x} \\ tg\,B = \dfrac{h}{20\sqrt{12}-x} \end{array}\right\} \quad \left.\begin{array}{l} \sqrt{3} = \dfrac{h}{x} \\ \frac{5}{2}\sqrt{6} = \dfrac{h}{20\sqrt{12}-x} \end{array}\right\}$$

$$\left.\begin{array}{l} \sqrt{3}x = h \\ 50\sqrt{6}\cdot\sqrt{12} - \frac{5}{2}\sqrt{6}x = h \end{array}\right\} \quad 300\sqrt{2} - \frac{5}{2}\sqrt{6}\cdot\frac{h}{\sqrt{3}} = h \Rightarrow \quad 300\sqrt{2} - \frac{5}{2}\sqrt{2}h = h \Rightarrow$$

$$600\sqrt{2} - 5\sqrt{2}h = 2h \Rightarrow \quad 2h + 5\sqrt{2}h = 600\sqrt{2} \Rightarrow h(2+5\sqrt{2}) = 600\sqrt{2}$$

$$h = \frac{600\sqrt{2}(5\sqrt{2}-2)}{50-4} = \frac{600\sqrt{2}(5\sqrt{2}-2)}{46} = \frac{300\sqrt{2}(5\sqrt{2}-2)}{23} = \frac{1500\sqrt{4}-600\sqrt{2}}{23}$$

$$h = \frac{3000-600\sqrt{2}}{23}$$

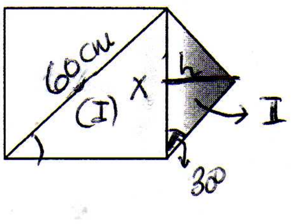
4.-Resolver la ecuación trigonométrica $2tagx \cdot senx + \sqrt{3}tagx = 0$

$tg\,x(2\,sen\,x + \sqrt{3}) = 0$

- $tg\,x = 0 \Rightarrow x = 0^\circ + 180k \quad x_3 = 0 + \pi k$
- $sen\,x = -\frac{\sqrt{3}}{2}$
  - $x = 240^\circ + 360^\circ k \Rightarrow x_1 = \pi + \frac{\pi}{3} + 2k\pi = \frac{4\pi}{3} + 2k\pi$
  - $x = 300^\circ + 360^\circ k \Rightarrow x_2 = 2\pi - \frac{\pi}{3} + 2k\pi = \frac{5\pi}{3} + 2k\pi$

$x = arc.\,sen\left(-\frac{\sqrt{3}}{2}\right)$

5.- El lado de un cuadrado de diagonal 60cm, es el lado desigual de un triangulo isósceles cuyos ángulos iguales valen 30^0 . Hallar el área del triángulo isósceles. Resolverlo todo usando trigonometría



(I) Hallamos el lado del cuadrado

$sen\,45^\circ = \frac{x}{60} \Rightarrow x = 60\cdot\frac{\sqrt{2}}{2} = 30\sqrt{2}$ lado cuadrado

(II) Hallamos la altura.

$tg\,30^\circ = \frac{h}{x/2} \Rightarrow \quad \frac{\sqrt{3}}{3} = \frac{h}{15\sqrt{2}} \Rightarrow h = \frac{15\sqrt{6}}{3} = 5\sqrt{6}$

(III) $A = \frac{1}{2}x\cdot h = \frac{1}{2}\cdot 30\sqrt{2}\cdot 5\sqrt{6} = 75\cdot\sqrt{2}\sqrt{6} = 150\sqrt{3}$