



COLEGIO ALMA'S
bilingual school

APELLIDOS Y NOMBRE: Concepción 2^{do} Control 1^o Evaluación

CURSO: 1^o Bachillerato N° Ciencias

FECHA: 10-11-2017

ASIGNATURA: Matemáticas I

1) a) $2^{-2x} = 2^{3(x+1)} \rightarrow -2x = 3x + 3 \rightarrow -5x = 3 \rightarrow \boxed{x = -3/5}$

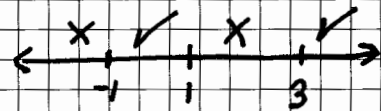
b) $a = 3^x \quad 3a + a + \frac{a}{3} = 117 \quad \text{mcm} = 3 \quad 9a + 3a + a = 3 \cdot 117$
 $13a = 3 \cdot 117 \rightarrow a = 27$

$3^x = 27 \rightarrow \boxed{x = 3}$

c) $\frac{1}{2} \log(x+1) - \frac{1}{2} \log x = 3 \quad \text{mcm} = 2$

$\log \frac{x+1}{x} = 6 \rightarrow x+1 = 10^6 x \rightarrow 10^6 x - x = 1 \rightarrow \boxed{x = \frac{1}{10^6 - 1}}$

2) a)
$$\begin{array}{c|cccc} & -1 & 3 & 1 & -3 \\ 3 & & -3 & 0 & 3 \\ \hline & -1 & 0 & 1 & 0 \end{array}$$

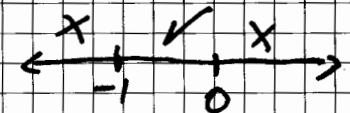


$\rightarrow -x^2 + 1 = 0 \rightarrow x = \pm 1$

$\boxed{x \in (-1, 1) \cup (3, \infty)}$

b) $\frac{x^3 + x}{x+1} < 0 \quad \text{mcm} = x+1 = 0 \rightarrow x = -1$

$x^3 + x = 0 \rightarrow x(x^2 + 1) = 0 \rightarrow x = 0$



$\boxed{x \in (-1, 0)}$

3) $x - y = 4 \rightarrow y = x - 4$

a) $x^2 + y^2 = 58 \rightarrow x^2 + (x-4)^2 = 58 \rightarrow x^2 + x^2 - 8x + 16 = 58$

$2x^2 - 8x - 42 = 0$

$x^2 - 4x - 21 = 0$

$x = \frac{4 \pm \sqrt{16 + 84}}{2} = \frac{4 \pm 10}{2}$

$\boxed{x = 7} \rightarrow \boxed{y = 3}$

$\boxed{x = -3} \rightarrow \boxed{y = -7}$

b) $xy = 2 \rightarrow y = \frac{2}{x}$

$xy + x^2 + y^2 = 7 \rightarrow x^2 + (\frac{2}{x})^2 = 5 \rightarrow x^4 + 4 = 5x^2 \rightarrow x^4 - 5x^2 + 4 = 0$
 $\text{mcm} = x^2$

$x^2 = \frac{5 \pm \sqrt{25 - 16}}{2} = \frac{5 \pm 3}{2}$

$x^2 = 4 \rightarrow \begin{cases} \boxed{x = 2} \rightarrow \boxed{y = 1} \\ \boxed{x = -2} \rightarrow \boxed{y = -1} \end{cases}$

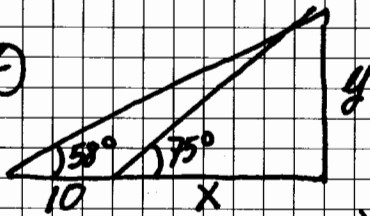
$x^2 = 1 \rightarrow \begin{cases} \boxed{x = 1} \rightarrow \boxed{y = 2} \\ \boxed{x = -1} \rightarrow \boxed{y = -2} \end{cases}$



$$d) \begin{pmatrix} 2 & 3 & -1 & | & 2 \\ 1 & -1 & 1 & | & 5 \\ 1 & 1 & -3 & | & -1 \end{pmatrix} \begin{array}{l} 2F_2 - F_1 \\ 2F_3 - F_1 \end{array} \begin{pmatrix} 2 & 3 & -1 & | & 2 \\ 0 & -5 & 3 & | & 8 \\ 0 & -1 & -5 & | & -4 \end{pmatrix} \begin{array}{l} 5F_3 - F_2 \\ \text{SCD} \end{array} \begin{pmatrix} 2 & 3 & -1 & | & 2 \\ 0 & -5 & 3 & | & 8 \\ 0 & 0 & -28 & | & -28 \end{pmatrix} \rightarrow \boxed{z=1}$$

$$-5y+3=8 \rightarrow -5y=5 \rightarrow \boxed{y=-1} \quad 2x-3-1=2 \rightarrow 2x=6 \rightarrow \boxed{x=3}$$

(4)



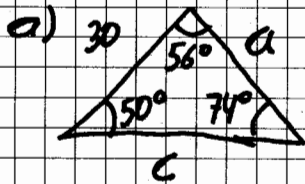
$$\lg 75 = \frac{y}{x} \rightarrow y = x \lg 75$$

$$\lg 58 = \frac{y}{x+10} \rightarrow y = (x+10) \lg 58$$

$$x \lg 75 - x \lg 58 = 10 \lg 58 \rightarrow x = \frac{10 \lg 58}{\lg 75 - \lg 58}$$

$$y = \frac{10 \lg 58 \lg 75}{\lg 75 - \lg 58} = \boxed{28 \text{ m}}$$

(5)



$$\frac{\sin 50^\circ}{a} = \frac{\sin 74^\circ}{30} \rightarrow a = \frac{30 \sin 50^\circ}{\sin 74^\circ} = \boxed{23'9 \text{ cm}}$$

$$\frac{\sin 56^\circ}{c} = \frac{\sin 74^\circ}{30} \rightarrow c = \frac{30 \sin 56^\circ}{\sin 74^\circ} = \boxed{25'9 \text{ cm}}$$

$$b) \quad 33^2 = 24^2 + 20^2 - 2 \cdot 24 \cdot 20 \cdot \cos a \rightarrow a = \arccos \frac{33^2 - 24^2 - 20^2}{-2 \cdot 24 \cdot 20}$$

$$\boxed{a = 96'8^\circ}$$

$$24^2 = 33^2 + 20^2 - 2 \cdot 33 \cdot 20 \cdot \cos b \rightarrow b = \arccos \frac{24^2 - 33^2 - 20^2}{-2 \cdot 33 \cdot 20}$$

$$\boxed{b = 46'2^\circ}$$

$$C = 180 - 96'8 - 46'2 \Rightarrow \boxed{C = 37^\circ}$$