UNIVERSIDAD NACIONAL DE ROSARIO
Instituto Politécnico Superior "General San Martín"

Examen de Ingreso "Ciclo Terciario 2012" resuelto

Asignatura: Matemática Fecha: 28/02/12

Problema Nº 1:

a)

$\Delta < 0 \Rightarrow b^2 - 4ac < 0$

$(+2)^2 - 4.h.(-5) < 0$

$4 + 20h < 0$

$20h < -4$

$\frac{1}{20} . 20h < -4 . \frac{1}{20}$

$h < -\frac{4}{20}$

$\boxed{\mathbf{h < -\frac{1}{5}}}$

b)

$\frac{\frac{1}{2} - 3h}{3} - (-1)^o < 2$

$\frac{\frac{1}{2} - 3h}{3} - 1 < 2$

$\frac{\frac{1}{2} - 3h}{3} < 3$

$3 . \frac{\frac{1}{2} - 3h}{3} < 3 . 3$

$\frac{1}{2} - 3h < 9$

$-3h < 9 - \frac{1}{2}$

$-3h . (-\frac{1}{3}) > \frac{17}{2} . (-\frac{1}{3})$

$\boxed{h > -\frac{17}{6}}$

c)

$h^2 - 4 \neq 0$

$h^2 \neq 4$

$|h| \neq 2$

$\boxed{\mathbf{h \neq 2 \qquad h \neq -2}}$

d)

$(\frac{1}{3})^{5h+2} = 27$

$(3^{-1})^{5h+2} = 3^3$

$3^{-5h-2} = 3^3$

$-5h - 2 = 3$

$-5h = 5$

$\boxed{\mathbf{h = -1}}$

Problema Nº 2:

a)

$$3\,|4x-1| = 5$$

$$|4x-1| = \frac{5}{3}$$

$$4x-1 = \frac{5}{3} \;\vee\; 4x-1 = -\frac{5}{3}$$

$$4x = \frac{5}{3}+1 \;\vee\; 4x = -\frac{5}{3}+1$$

$$4x = \frac{8}{3} \;\vee\; 4x = -\frac{2}{3}$$

$$x = \frac{8}{12} \;\vee\; x = -\frac{2}{12}$$

$$\boxed{x = \frac{2}{3} \;\vee\; x = -\frac{1}{6}}$$

$$\boxed{\textbf{Sol.} = \left\{-\frac{1}{6}; \frac{2}{3}\right\}}$$

b)

$$\frac{1}{2}(x-3) - \frac{5}{2}(x+2) = 1-2x$$

$$\frac{1}{2}x - \frac{3}{2} - \frac{5}{2}x - 5 = 1-2x$$

$$-\frac{4}{2}x + 2x = 1+5+\frac{3}{2}$$

$0x = \frac{15}{2}$ ecuación sin solución

$$\boxed{\text{Sol.} = \{\ \}}$$

Problema Nº 3:

a)

$$\frac{2x-4}{\sqrt{x}+\sqrt{2}} = \frac{2(x-2)}{(\sqrt{x}+\sqrt{2})} \cdot \frac{(\sqrt{x}-\sqrt{2})}{(\sqrt{x}-\sqrt{2})} =$$

$$= \frac{2(x-2)(\sqrt{x}-\sqrt{2})}{\sqrt{x^2}-\sqrt{2^2}} =$$

$$= \frac{2(x-2)(\sqrt{x}-\sqrt{2})}{x-2} =$$

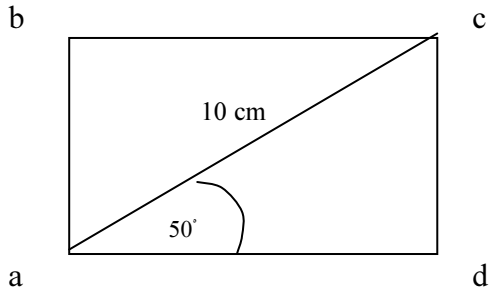
$$= 2(\sqrt{x}-\sqrt{2})$$

b)

$$\frac{\sqrt{b}.\sqrt[3]{ab}}{a^{-2}} = \frac{b^{1/2}.a^{1/3}.b^{1/3}}{a^{-2}} =$$

$$= b^{\frac{1}{2}+\frac{1}{3}} . a^{\frac{1}{3}-(-2)} = a^{\frac{7}{3}} . b^{\frac{5}{6}}$$

Problema Nº 4:



$\text{sen } 50^\circ = \frac{cd}{10cm}$ $\cos 50^\circ = \frac{ad}{10cm}$

$10cm \text{ sen } 50^\circ = cd$ $10 \text{ cm} \cos 50^\circ = ad$

$7{,}66 \text{ cm} \cong cd$ $6{,}43 \text{ cm} \cong ad$

Perímetro rectángulo = $2\,cd + 2\,ad = (15{,}32 + 12{,}86)$ cm

P = 28,18 cm

Problema Nº 5:

$$\begin{cases} 2x - y = -2 & (1) \\ y - x = \frac{5}{2} & (2) \end{cases}$$

En (2) : $y = x + \frac{5}{2}$

Sustituimos en (1) : $2x - (x + \frac{5}{2}) = -2$

$2x - x - \frac{5}{2} = -2$

$x = -2 + \frac{5}{2}$

$x = \frac{1}{2}$

$2.\frac{1}{2} - y = -2$

$1 - y = -2$

$1 + 2 = y$

$3 = y$

$$Solución = \left\{ \left(\frac{1}{2}; 3 \right) \right\}$$