

Sala Galileo



Adobe Reader
8

Gauss



Empiricus



Secure File
Transfer Client



ImageJ



Microsoft
Outlook



Interwrite
Workspace



Secure Shell
Client



LabVIEW
SignalExpress



VideoCAM Eye



Maple 10



Consola de
Tutor de...



MATLAB
R2006b



ScienceWor...



Microsoft Excel



Gauss.asv



Internet



Papelerera de
reciclaje

Departamento de Física Universidad de Chile

Inicio

InterWrite

16:59

P₂ a) Demuestre la sigte desigualdad

$$\forall x, y \in \mathbb{R} \setminus \{0\} \quad x^2 + xy + y^2 > 0$$

b) Demuestre que si $x^3 + x = y^3 + y \Rightarrow x = y$

Sol:

$$\begin{aligned} \text{a)} \quad \forall a, b \in \mathbb{R} \quad & 1) (a+b)^2 \geq 0 \Rightarrow a^2 + b^2 \geq -2ab \\ & 2) (a-b)^2 \geq 0 \Rightarrow a^2 + b^2 \geq 2ab \end{aligned}$$

$$\text{Sea } x, y \in \mathbb{R}$$

$$(x+y)^2 = x^2 + 2xy + y^2 \geq 0$$

$$6 = x^2 + xy + xy + y^2 \geq 0$$

$$x^2 + xy + y^2 \geq -xy$$

$$\frac{\text{per caso}}{x \cdot y < 0} \Rightarrow -x \cdot y > 0$$

$$x^2 + x \cdot y + y^2 \geq -x \cdot y > 0$$

$$\frac{\text{2do caso}}{x \cdot y > 0}$$

$$(x-y)^2 = x^2 - 2xy + y^2 \geq 0$$

$$x^2 - xy + y^2 \geq xy > 0$$

$$> \quad x^2 + xy + y^2 \geq x^2 - xy + y^2 > 0$$

$$b) \quad \underbrace{x^3 + x = y^3 + y}_{\Rightarrow x=y}$$

$$x^3 - y^3 = -x + y$$

$$(x-y)(x^2 + xy + y^2) = -(x-y)$$

$$x \neq y$$

$$x^2 + xy + y^2 = -1 \xrightarrow{a} \text{X}$$

$$\boxed{x=y}$$

//

$$|x| \leq |x-1|$$

$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$

ptos críticos: 0, 1

• $x < 0$:

$$-x \leq -(x-1)$$

$$-x \leq -x + 1$$

$$\Rightarrow 0 \leq 1$$

• $x \in [0, 1)$

$$x \leq -(x-1)$$

$$x \leq -x + 1$$

$$x \in [0, \frac{1}{2}]$$

$$2x \leq 1$$

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

$$\bullet x \geq 1$$

$$|x| \leq |x-1|$$

$$x \leq x-1$$

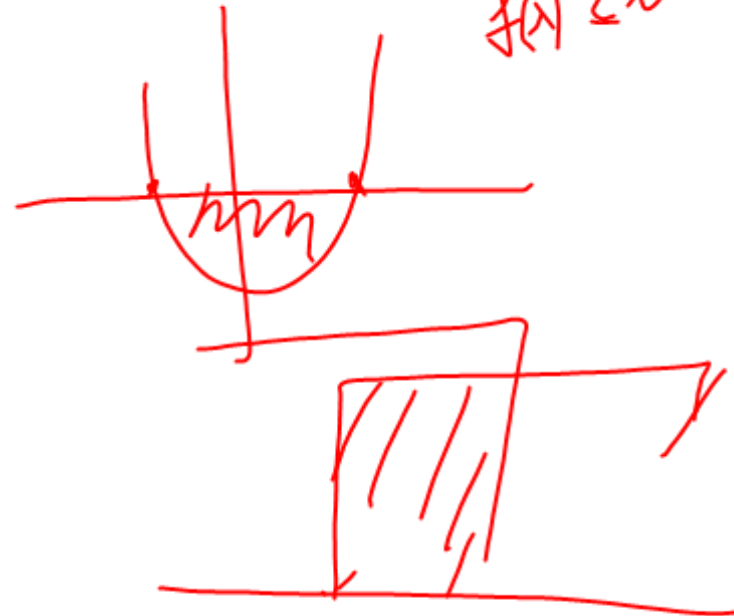
$$0 \leq -1$$

$$S = (-\infty, 0) \cup \left[0, \frac{1}{2}\right] \cup \cancel{\emptyset}$$

$$= (-\infty, \frac{1}{2}]$$

$$ax^2 + bx + c = f(x)$$

$$f(x) < 0$$



$$b) \quad 1^2 + \frac{2}{x} \geq 3.$$

$$a) \quad a^3 + 2b^3 \geq 3ab^2 \quad / \quad ab^2 > 0$$

$$\Leftrightarrow \frac{a^3}{ab^2} + \frac{2b^3}{ab^2} \geq 3$$

$$\Leftrightarrow \frac{a^2}{b^2} + 2 \frac{b}{a} \geq 3$$

$$|b| \quad x = \frac{a}{b}$$