Invierno Calculo I

$(x-5)(x+3) > -12$

$x^2-2x-15 > -12$

$x^2-2x-3 > 0$

$(x-3)(x+1) > 0$

Segundo

$Cs: (-\infty, -1) \cup (3, +\infty)$

$(1-5)(1+3) > -12$

$4 \cdot 4$ $\quad 8 > -12$

V

(2) $x^2+2x+2>0$

$(x^2+2x+1)+1>0$

$(x+1)^2+1>0$

$(x+1)^2 \geq 0$

$1 \geq 0$

$(x+1)^2+1>0$

$Cs: \mathbb{R}$

(3) $\dfrac{2-x}{x+1} \geq \dfrac{3}{2}$

$\dfrac{2-x}{x+1} - \dfrac{3}{2} \geq 0$

$\dfrac{2(2-x)-3(x+1)}{2(x+1)} \geq 0$

$\dfrac{4-2x-3x-3}{x+1} \geq 0/2$

$\dfrac{-5x+1}{x+1} \geq 0$

$\left(\dfrac{1-5x}{1}\right) \cdot \left(\dfrac{1}{x+1}\right) \geq 0$

Primera posivilidad

$1-5x \geq 0$ y $x+1>0$

$\frac{1}{5} \geq x$ $\quad x>-1$

$1-5 \cdot 1 \geq 0$ $\quad 1+1>0$

$4 \geq 0$ $\quad 2>0$

V $\quad$ V

$\dfrac{2-1}{1+1} \geq \dfrac{3}{2}$ $\quad \dfrac{2-(-2)}{-2+1} \geq \dfrac{3}{2}$

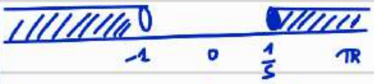
$\frac{1}{2} \geq \frac{3}{2}$ $\quad \frac{4}{1} \geq \frac{3}{2}$

F $\quad$ V

Segunda Posivilidad

$1-5x \leq 0$ y $x+1 \leq 0$

$\frac{1}{5} \leq x$ y $x < -1$



Asi el conjunto solución esta dado

$Cs: (-1, \frac{1}{5}]$

(3) $x^2 \leq 1$

$x^2-1 \leq 0$

$(x+1)(x-1) \leq 0$

$x+1 \leq 0$ y $x-1 \geq 0$

$x \leq -1$ y $x \geq 1$

$x+1 \geq 0$ y $x-1 \leq 0$

$x \geq -1$ y $x \leq 1$

$Cs: [-1, 1]$

Inecuaciones: las ecuaciones tienen el simbolo "=", las inecuaciones tienen simbolos de $<$ $>$ o $\leq$ $\geq$

1) $3x-7 \leq 11$

Solución

$3x-7-11 \leq 0$

$3x \leq 18$

$x \leq \frac{18}{3} = 6$

$\boxed{x \leq 6}$

Conjunto solución $= (-\infty, 6]$

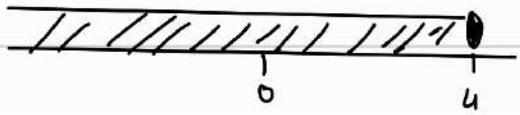
2) $6x-2 \leq 3x+10$

$6x-3x-2-10 \leq 0$

$3x-12 \leq 0$

$x \leq \frac{12}{3} = 4$

$x \leq 4$



$Cs = (-\infty, 4]$

3) $\frac{3x+8}{7} \leq \frac{5x-2}{4}$

$\frac{3x+8}{7} - \frac{5x-2}{4} \leq 0$

Solucion

$\frac{3x+8}{7} \leq \frac{5x-2}{4}$

$4(3x+8) \leq 7(5x-2)$

$12x+32 \leq 35x-14$

$12x-35x \leq -14-32$

// $-23x \leq -46$ // (-1)

$23x \geq 46$

$x \geq \frac{46}{23}$

$x \geq 2$

$[2, +\infty)$

4) $x^2+10<7x$

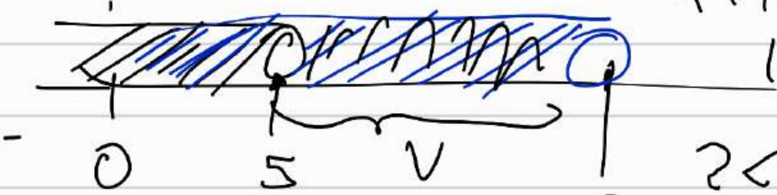
$x^2-7x+10<$ $\quad = x = 0$

$(x-5)(x-2)<0$ $\quad 10<0$ F

$x=5 \quad x=2$

$x<5;\ x<2$ // ¿?

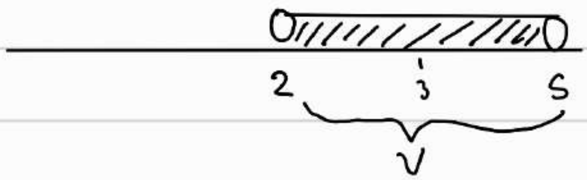
$9+10<21$



$19<21$ V

$2<x<$?

$CS=(-\infty,5)\cup(-\infty,2)$ $\quad cs:(2,5)$



$3^2+10<7\cdot3$

$9+10<21$

$19<21$

5) $x^2-4x+3\geq0$ $\quad 2<x<5$

$(x-3)(x-1)\geq0$

$x-3\geq0 \Rightarrow x\geq3$

$x-1\geq0 \Rightarrow x\geq1$ $\quad CS=[1,+\infty)\cup[3,+\infty)$

9) $\left|\frac{x-1}{x-3}\right|>2$ $\quad \overbrace{-2>\underbrace{\frac{x-1}{x-3}>2}_{II}}^{I}$

$x-1>2$ $\quad x-3>2$

$x>3$ $\quad x>5$ $\quad -2(x-3)>x-1$

$-2x+6>x-1$

$+3x>-7$ (-1)

$Cs=[3,5]$

Respuesta: $\frac{7}{3}<x<5$ $\boxed{x<\frac{7}{3}}$

$\left|\frac{x-1}{x-3}\right|^2>2^2$

$\left(\frac{x-1}{x-3}\right)^2>2^2$

$\frac{x-1}{x-3}>2$

$x-1>2x-6$

$-x>-5$ (-1)

$\boxed{x<5}$ $\quad -a>|x|>a$

Ecuaciones en Valor absoluto

Ejercicios

$|x|+3=7$

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

Solucion

$x+3=7$

$x=7-3$

$x=4$

$x+3=7$

$(-x)+3=7$

$=7-3$

$\cancel{x=4}$

$x>0$ $\quad x<0$

$|x-2|=6$

$(x-2)=6$

$x=6+2$

$x=8$

9) $\left|\frac{x-1}{x-3}\right|>2$

$-2>\left|\frac{x-1}{x-3}\right|>2$

$-2>\frac{x-1}{x-3}$

$-2(x-3)>x-1$

$-2x+6>x-1$

$-2x-x>-7$ (-1)

$3x<7$

$x<\frac{7}{3}$

$\left|\frac{x-1}{x-3}\right|>2$

$\frac{|x-1|}{|x-3|}>2$

$\frac{x-1}{x-3}>2$

$x-1>2(x-3)$

$x-1>2x-6$

$x-2x>-6+1$

$-x>-5$ (-1)

$x<5$

$-2>\left|\frac{x-1}{x-3}\right|>2$

$-2>\left|\frac{x-1}{x-3}\right|$

$-2>\frac{x-1}{x-3}$

$-2(x-3)>x-1$

$-2x+6>x-1$

$-2x-x>-1-6$

$-3x>-7$ (-1)

$3x<7$

$x<\frac{7}{3}$

$\left|\frac{x-1}{x-3}\right|>2$

$\frac{x-1}{x-3}>2$

$x-1>2(x-3)$

$x-1>2x-6$

$x-2x>-6+1$

$-x>-5$ (-1)

$x<5$

$CS=\left(-\infty,\frac{7}{3}\right)\cup(-\infty,5)$

$Cs: \frac{7}{3}<x<5$

$Cs: \left(\frac{7}{3},5\right)$

Ejercicios

$|2x-5|\leq 3$

$-3\leq|2x-5|\leq 3$ | $|2x-5|\leq 3$

$-3\leq|2x-5|$
$-3\leq 2x-5$
$-3+5\leq 2x$
$2\leq 2x$
$\frac{2}{2}\leq x$
$1\leq x$

$2x-5\leq 3$
$2x\leq 3+5$
$2x\leq 8$
$x\leq\frac{8}{2}$
$x\leq 4$

$CS = 1\leq x\leq 4$

$|x^2-5x+5|<1$

Solución:

$-1<x^2-5x+5<1$

$-1<x^2-5x+5$
$0<x^2-5x+5+1$
$0<x^2-5x+6$
$0<(x-3)(x-2)$

$x^2-5x+5<1$
$x^2-5x+5-1<0$
$x^2-5x+4<0$
$(x-4)(x-1)<0$

$x<3$ $\quad x<4$
$x<2$ $\quad x<1$

$CS=$
$1<x<2\ ;\cap\ 3<x<4$

h) $\left|\frac{3x+5}{x+1}\right|>4$

$-4>\left|\frac{3x+5}{x+1}\right|>4$

i)
$-4>\frac{3x+5}{x+1}$
$-4(x+1)>3x+5$
$-4x-4>3x+5$
$-7x>9$
$x>\frac{9}{-7}$
$x>\frac{9}{-7}$
$x>-\frac{9}{7}$

$\frac{3x+5}{x+1}>4$
$3x+5>4(x+1)$
$3x+5>4x+4$
$-1x>-1\ (-1)$
$1x<1$
$x<\frac{1}{1}$
$x<1$

$Cs: -\frac{9}{7}<x<1$

1.8) K) $|x-7|-|x-5|<0$

$|x-7|<|x-5|$
$|x-7|^2<|x-5|^2$
$(x-7)^2<(x-5)^2$
$(x-14x+49)<($

$|x-7|-|x-5|<0$ | $x>6$

$|x-7|<|x-5|$
$x-7<x-5$
$x-x<-5+7$
$0<2$ xD !!

k) $|x-7|-|x-5|<0$
$|x-7|<|x-5|$ $\quad //^2$
$(x-7)^2<(x-5)^2$
$(x^2-14x+49)<(\cancel{x^2}-10x+25)$
$(x-7)(x-7)<(x-5)(x-5)$
$-4x+24<0$
$-4x<-24 \quad //\cdot -1$
$4x>24$
$x>\frac{24}{4}$
$x>6$

$|x-7|-|x-5|<0$
$(x-7)^2<(x+5)^2$
$(\cancel{x^2}-14x+49)<(\cancel{x^2}+10x+25)$
$-24x+24<0$
$x<-\frac{24}{24}$ 1
$x<1$

l) $|x-4|-|x-5|>0$
$(x-4)^2>(x-5)^2$
$(\cancel{x^2}-14x+81)>(\cancel{x^2}-10x+25)$
$-8x+56>0$
$-8x>-56 \quad \cdot -1$
$8x<56$
$x<\frac{56}{8}$
$x<7$

w) $|x^2-10|<6$
$-6<x^2-10<6$
$-6+10<x^2<6+10$
$4<x^2<16$
$\sqrt{4}<x<\sqrt{16}$
$2<x<8$

$|x^2-10|<6$
$(x^2-10)^2<6^2$
$x(x-10)^2<36$
$x(x^2-20x+100)<76$
$x^3-20x^2+100x<76$

	1	-20	+100
10			-100
	1	-10	0
10		10	
	1	0	

$(x-10)(x-10)$

$(x - 14x + 49) < (x - 10x + 25)$

$x - 7 - (x - 5) < 0$

$|x - 7| - |x - 5| < 0$

$|x| - |7| - |x| - |5| < 0$

$x - 7 < |x| + |5|$

$x - 7 < x + 5$

$x < x + 5 + 7$

$x < x + 12$

$|x - 7| - |x - 5| < 0$

$(x - 7) - (x - 5)$ | $x - 7 - x - 5 < 0$

$x(-7 - 5) < 0$ | $1(x - 7 - x - 5) < 0$

$x(-2) < 0$

$\frac{0}{x}$

Jams stwart

1.8 a) $|x - 5| < 2$

$|x - 5|^2 < 2^2$

$(x - 5)^2 < 2^2$

$(x - 5)^2 < 2^2$

$\sqrt{(x-5)^2} < 2$

$x - 5 < 2$

$x < 2 + 5$

$x < 7$

$-2 < |x - 5| < 2$

$-2 < x - 5$ $\quad x - 5 < 2$

$-2 + 5 < x$ $\quad x < 7$

$3 < x$ $\quad$ CS: $3 < x < 7$ //

$\frac{2x - 3}{x + 1} \leq 1$ $\quad R: (-1, 4]$

$2x - 3 \leq 1(x + 1)$

$2x - 3 \leq x + 1$

$x \leq 4$

$-1 \leq \frac{2x - 3}{x + 1}$

$-1(x + 1) \leq 2x - 3$

$-x - 1 \leq 2x - 3$

$2x \leq 2$

k) $|x - 7| - |x - 5| < 0$ $\quad = x > 6$

a) $7x + 1 \geq \frac{1}{2}x - \frac{x - 1}{3}$

b) $2(x - 4) + 3x < 5x - 7$

c) $-2 \leq 3x - 5 < 8$

d) $\frac{4}{x} - 3 > \frac{2}{x}$

e) $x^3 + 4x^2 + x - 6 > 0$

f) $-1 \leq x^3 - 2x^2 < x$

g) $1 - 2x - 3x^2 \leq 0$

h) $\frac{2x + 6}{5 - x} \geq 3$

i) $\frac{x - 2}{x - 4} < \frac{x + 2}{x}$

j) $\frac{5x}{x + 4} \geq 5$

f) $\overbrace{-1 \leq x^3 - 2x^2} < x$

$-1 \leq x^3 - 2x^2$

$0 \leq x^3 - 2x^2 + 1$

$x(x^2 - 2x + 1)$

$0 \leq x((x - 1)(x - 1))$

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

$\leq x^2 - 1x \cdot x^2 - 1x$

$-1 \leq x^3 - 2x^2 < x$

$-1 \cdot \frac{1}{2} \leq x^3 - \cancel{2}x^2 \cdot \frac{1}{\cancel{2}} < x$

$-\frac{1}{2} \leq x^3 - x^2 < \frac{1x}{2}$

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

a) $7x + 1 \geq \frac{1}{2}x - \frac{x - 1}{3}$

$7x + 1 \geq x \cdot \frac{1}{2} - \frac{x - 1}{3}$

$\geq \frac{1x}{2} - \frac{x - 1}{3}$

$7x + 1 \geq \frac{3x - (2x - 2)}{6}$

$\geq \frac{3x - 2x - 2}{6}$

$\geq \frac{1x - 2}{6}$

$7x + 1 \cdot 6 \geq$

$7x + 1 \cdot 6 - 1x + 2 \geq 0$

$6x + 8 \geq 0$

$6x \geq -8$

$x \geq -\frac{8}{6}$

$x \geq -\frac{4}{3}$

c) $-2 \leq 3x - 5 < 8$

$-2 + 5 \leq 3x - 5 + 5 < 8 + 5$

$3 \leq 3x < 13$

$3 \cdot \frac{1}{3} \leq 3x \cdot \frac{1}{3} < 13 \cdot \frac{1}{3}$

$1 \leq x < \frac{13}{3}$

b) $2(x - 4) + 3x < 5x - 7$

$2(x - 4) + 3x - 5x + 7 < 0$

$\cancel{2x} - 8 + \cancel{3x} - \cancel{5x} + 7 < 0$

$-1 < 0$

d) $\frac{4}{x} - 3 > \frac{2}{x}$

$\frac{3x - 4}{x} > \frac{2}{x}$

$x(3x - 4) > x(2)$

$3x^2 - 4x > 2x$

$3x^2 - 4x - 2x > 0$

$3x^2 - 6x > 0$

$3x^2 - 6x > 0$

$3(x^2 - 3x) > 0$

e) $x^3 + 4x^2 + x - 6 > 0$

	1	+4	+1	−6
1		1	5	6
	1	5	6	0

$0^3 + 4 \cdot 0^2 + 0 - 6 > 0$

$0 + 0 + -6 > 0$ F

$(x - 1)(x^2 + 5x + 6)$ $\quad (x - 1)(x - 2)(x - 3) > 0$

$2 = 2x$ $\quad x = 1$

$3 = 3x$ $\quad x = 2$

$5x$ $\quad x = 3$

F V F V

0 1 2 3

CS: $(1, 2) \cup (3, \infty)$

1. $-1 \leq -3 + 3x < 2$ **Rpta.** $[\frac{2}{3}, \frac{5}{3}>$

2. $\frac{x}{2} - \frac{1}{4} > 2x + \frac{1}{3}$ **Rpta.** $<-\infty, -\frac{7}{18}>$

3. $-3x + 4 \leq 4x + 5$ **Rpta.** $[-\frac{1}{7}, +\infty>$

4. $\frac{2x+6}{3} - \frac{x}{4} < 5$ **Rpta.** $<-\infty, \frac{36}{5}>$

5. $5x - 2 < 10x + 8 < 2x - 8$ **Rpta.** ϕ

6. $-\frac{1}{5} \leq 3x - \frac{1}{4} \leq \frac{1}{3}$ **Rpta.** $[\frac{1}{60}, \frac{7}{36}]$

7. $\frac{x}{a^2-b^2} + \frac{3x}{a+b} < \frac{5}{a-b}$, $a > b > 0$ **Rpta.** $<-\infty, \frac{5a+5b}{1+3a-3b}>$

b) $|2x - 9| < 1$

c) $|x - 6| > 1$

d) $|3x - 8| > 4$

① $-1 \leq -3 + 3x < 2$

$-1+3 \leq 3x < 2+3$

$2 \leq 3x < 5$

$\frac{2}{3} \leq x < \frac{5}{3}$

CS: $[\frac{2}{3}, \frac{5}{3})$

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

$\frac{4x-2}{8} > \frac{6x+1}{3}$

$3(4x-2) > 8(6x+1)$

$12x - 6 > 48x + 8$

$-6-8 > 36x$

$-\frac{7}{18}\ \cancel{\frac{14}{36}} > x$

$-\frac{7}{18} > x$

$-\frac{7}{18}$ 0 $-\infty$

$\frac{0}{2} - \frac{1}{4} > 2\cdot 0 + \frac{1}{3}$ Cs: $(-\infty, -\frac{7}{18})$

$\frac{2-0}{8}$

$\cancel{\frac{2}{8}}$

$\frac{1}{4} > \frac{1}{2}$ V

③ $-3x + 4 \leq 4x + 5$

$-7x \leq 1$ $//-1$

$x \leq -\frac{1}{7}$

$-\frac{1}{7}$ 0

$-3\cdot 0 + 4 \leq 4 \cdot 0 + 5$ Cs: $(+\infty, -\frac{1}{7}]$

$0 + 4 < 0 + 5$

$4 < 5$

V

④ $\frac{2x+6}{3} - \frac{x}{4} < 5$

$\frac{4(2x+6) - 3(x)}{12} < 5$

$\frac{8x + 24 - 3x}{12} < 5$

$8x + 24 - 3x < 5 \cdot 12$

$5x + 24 < 60$

$5x < 36$

$x < \frac{36}{5}$

0 $\frac{36}{5}$

$\frac{2\cdot 0 + 6}{3} - \frac{0}{4} < 5$

$\cancel{\frac{6}{3}}\ \frac{3}{1}$

$\frac{3}{1} - \frac{0}{4}$

$\cancel{\frac{12}{4}} = 3 < 5$

V

⑥ $-\frac{1}{5} \leq 3x - \frac{1}{4} \leq \frac{1}{3}$

$-\frac{1}{5} \leq 3x - \frac{1}{4}$	$3x - \frac{1}{4} \leq \frac{1}{3}$
$-\frac{1}{5} + \frac{1}{4} < 3x$	$3x \leq \frac{1}{3} + \frac{1}{4}$
$\frac{-4+5}{20}$	$3x \leq \frac{3+4}{12} = \frac{7}{12}$
$\frac{\frac{1}{20}}{3} < x$	$x \leq \frac{\frac{7}{12}}{3}$
$\frac{1}{60} < x$	$x \leq \frac{7}{36}$

CS: $[\frac{1}{60}, \frac{7}{36}]$

⑤ $5x - 2 < 10x + 8 < 2x - 8$

$5x - 2 - 8 < 10x < 2x - 8 - 8$

$5x - 10 < 10x < 2x - 16$

$5x - 10 \cdot \frac{1}{10} < x < 2x - 16 \cdot \frac{1}{10}$

$5x - 1 < x < 2x - \frac{8}{5}$

$5x - 1 < x$

$-1 < -4x$ $//-1$	$x < 2x - \frac{8}{5}$
$1 < 4x$	$-x < -\frac{8}{5}$ $//-1$
$\frac{1}{4} < x$	$x < \frac{8}{5}$

Cs: $\frac{1}{4} < x < \frac{8}{5}$ X

0 $\frac{1}{4}$ $\frac{8}{5}$

⑤ $5x - 2 < 10x + 8 < 2x - 8$

$5x - 2 < 10x + 8$	$10x + 8 < 2x - 8$
$-10 < 5x$	$8x < 16$
$\frac{-10}{5} < x$	$x < \frac{16}{8}$
$-2 < x$	$x < 2$

V

b) $|2x - 9| < 1$

$-1 < |2x - 9| < 1$

$-1 < 2x - 9$	$2x - 9 < 1$
$8 < 2x$	$2x < 10$
$\frac{8}{2} < x$	$x < \frac{10}{2}$
$4 < x$	$x < 5$

Cs: $4 < x < 5$

c) $|x - 6| > 1$

$-1 < x - 6 > 1$

Cs: $5 < x$; $x > 7$

d) $|3x - 8| > 4$

$-4 < 3x - 8 > 4$	$3x - 8 > 4$
$-4 < 3x - 8$	$3x > 12$
$4 < 3x$	$x > 4$
$\frac{4}{3} < x$	

CS: $\frac{4}{3} < x$, $x > 4$

j: $\left|\frac{3x+5}{x+1}\right| > 4$

$-4 < \frac{3x+5}{x+1} > 4$

$-4 < \frac{3x+5}{x+1}$	$\frac{3x+5}{x+1} > 4$
$-4(x+1) < 3x+5$	$3x+5 > 4(x+1)$
$-4x - 4 < 3x + 5$ $//-1$	$3x + 5 > 4x + 4$
$4x + 4 > -3x - 5$	$1 > x$
$x > -9$	

Cs: $x < -1$, $1 > x$

$\frac{6x+3}{(x-2)(x+3)} \geq 0$

$6x + 3 = 0$ $x - 2 = 0$

$x = -\cancel{\frac{3}{6}}\ \frac{1}{2}$ $x = 2$

$x = -3$

3 $\frac{1}{2}$ 0 2

$\frac{6x+3}{(x-2)(x+3)} \geq 0$

$\frac{3}{-2\ 3} > 0$

$-\frac{3}{6}$

$-\frac{1}{2} \geq 0$ F

⑥ $\left|\frac{x-1}{x-3}\right| \leq 1$

$\frac{x-1}{x-3} \leq 1$

$x - 1 \leq 1(x-3)$

$x - 1 \leq x - 3$

$0 \leq 2$

Si sabe que $f(3x-5) = 6x+14$ calcular $f(x)$

$f(3x-5) = 6x+14$

$3x-5 = t$

$3x = t+5$

$x = \frac{t+5}{3}$

$f(t) = \cancel{6}^{2}\left(\frac{t+5}{\cancel{3}_{1}}\right)+14$

$f(t) = 2t+15+14$

$f(t) = 2t+29$

Haora cambio t por x

$f(x) = 2x+29$

Si f es funcion tal que $3 \cdot f(2-x) + 2 \cdot f(x) = x^2$
Para to x que pertenece a los $\mathbb{R}$. Determinar $f(0) = ?$

$3 \cdot f(2-x) + 2 \cdot f(x) = x^2$

$f(0) = ?$ $x=0$

$3 \cdot f(2-0) + 2 \cdot f(0) = 0^2$

$3 \cdot f(2) + 2 \cdot f(0) = 0$ ①

$3 \cdot y + 2 \cdot x = 0$

Otra es

$x=2 \Rightarrow 3 \cdot f(2-2) + 2 f(2) = 2^2$

$3 \cdot f(0) + 2 \cdot f(2) = 4$ ②

$\begin{cases} 2x+3y=0 \ // 3 \\ 3x+2y=4 \ // (-2) \end{cases}$ $\rightarrow$ $\cancel{6x}+9y=0$; $-\cancel{6x}-4y=-8$

$5y=-8$

$\boxed{y = -\frac{8}{5}}$

CV $f(0) = x$

$f(2) = y$

$2x+3y=0$

$2x+3\left(-\frac{8}{5}\right)=0$

$2x - \frac{24}{5} = 0$

$\cancel{2}x = \frac{\cancel{24}^{12}}{5}$

$x = \frac{12}{5}$

$f(0) = \frac{12}{5}$

Si f es una Función tal que $f(1)=7$ y $f(x+y) = f(x) + f(y) + 3$
Para todo $x, y \in \mathbb{R}$ determinar $f(0)$

$f(1) = 7$

$f(x+y) = f(x) + f(y) + 3$

$f(0) = ?$

$f(0)$

$f(\underbrace{0+0}_{x \ y}) = f(0) + f(0) + 3$

$f(0) = f(0) + f(0) + 3$

$\boxed{-3 = f(0)}$

Composición de Funciones

$(f \circ g)(x) = f(g)$

$(g \circ h)(x) = g(h)$

Sean las Funciones

$f(x) = x-3$ $\quad$ $f(x) = x-3$

$g(x) = x^2+5$ $\quad$ $g(x) = x^2+5$

a) Calcular $(g \circ f)(x)$

$g(f)$

$g(x-3)$

$(g \circ f) = g(x-3)$

$g(x) = x^2+5$

$g(x-3) = ?$ $x = x-3$

$(x-3)^2+5$

$x^2-6x+14$

$\boxed{(g \circ f) = x^2-6x+14}$

b) Calcular $(f \circ g)(x)$

$f(g)$

$f(x^2+5)$

$(f \circ g) = f(x^2+5)$

$f(x) = x-3$ $\quad x = x^2+5$

$f(x^2+5)$

x^2+5-3

x^2+2

$\boxed{(f \circ g)(x) = x^2+2}$

Pregunta de examen 1-2022

Sea $f(x) = x^2-2x-1$ encuentre dos Funciones $g(x)$ tal que $(f \circ g) = f(x^2+5)$

$f(x) = x^2-2x-1$

$g(x) = ?$

$(f \circ g)(x) = x^2-3x$

$(f \circ g) = f(x^2+5)$

$f(g) = x^2-3x$ ①

otra vez $f(g) = ?$

Dato

$f(x) = x^2-2x-1$

$x = g$ CV

g^2-2g-1

$f(g) = g^2-2g-1$ ②

② = ①

$g^2-2g-1 = x^2-3x$ $\quad g = ?$

$\underbrace{g^2}_{a} - \underbrace{2g}_{b} \underbrace{-1-x^2-3x}_{c} = 0$

$a = 1$

$b = -2$

$c = -1-x^2-3x$

$g = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$g = \frac{2 \pm \sqrt{4-4 \cdot 1 \cdot -1-x^2+3x}}{2}$

$g = \frac{2 \pm \sqrt{4+4+4x^2-12x}}{2}$

$g = \frac{2 \pm \sqrt{4x^2-12x+8}}{2}$

$\lim_{x \to 2} 4x^2+x-4 = 14$ $(\forall \varepsilon > 0)(\exists \delta > 0) / Si (0 < |x-2| < \delta \wedge x \in Df) \Rightarrow |(4x^2+x-4)-14| < \varepsilon$

$|(4x^2+x-4)-14)$

$|4x^2+x-18|$

$4x \quad 9 = 9x$

$x \quad -2 = -8x$

x

$|x-2||4x+9| < \varepsilon$

$|x-2| < \varepsilon$

$|4x+9|$ $\quad k>0 \quad |4x+9| < k$

$|x-2| < \delta_1 = 1$

$|x-2| < 1$

$-1 < x-2 < 1$

$1 < x < 3$

$4 < 4x < 12$

$\lim_{x \to 1} (3x+2) = 5$

Solución:

$|x-1|$

$|3x+2-5| < \delta$

$|3x-3|$

$3|x-1| < \delta$

$|x-1| < \delta/3$

$\varepsilon > 0 \rightarrow \delta > 0$

$x \in \mathbb{R} \wedge 0 < |x-1| < \delta$

$|(3x+2)-5| < \varepsilon$

$|(3x-3)| < \varepsilon$

$|3(x-1)| < \varepsilon$

$|3||x-1| < \varepsilon$

$3 \ |x-1| < \varepsilon$

$|x-1| < \varepsilon/3$

$a = 2$

$b = -1$

$|a-b|$

$|2-(-1)|$

Resolver el sig limite
Validar

$\lim_{x \to 2} (5x-11) = -1$

$\varepsilon > 0 \to \delta > 0$

$x \in \mathbb{R} \wedge 0 < |x-2| < \delta$

$|(5x-11)-(-1)| < \varepsilon$

$|5x-11+1| < \varepsilon$

$|(5x-10)| < \varepsilon$

$|5(x-2)| < \varepsilon$

$|5|\,|x-2| < \varepsilon$

$5\,|x-2| < \varepsilon$

$|x-2| < \varepsilon/5$

$\lim_{x \to 2} (4-5x^2) = -16$

$\varepsilon > 0 \to \delta > 0$

$x \in \mathbb{R} \wedge 0 < |x-2| < \delta$

$\lim_{x \to 3} 3x+5 = 14$