Ayudantía Matemática Básica 20/Agosto/2020

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

Sol: $(x-1)(x^2 + x + 1) > 0$

Previo: $x^2 + x + 1 = 0$ (A= 1, B=1, C=1)<==> Disc = $(1)^2 - 4*1*1 = 1 - 4 = -3 < 0$

$x^2 + x + 1 > 0$ para todo x real

==> $x-1 > 0$ <==> $x > 1$ S=] 1,+oo[

7) $- x^3 + 2x^2 + 3x < 0$

Sol: $-x (x^2 - 2x - 3) < 0$

<==> $(-x < 0) \wedge (x^2 - 2x - 3 > 0)$ v $(-x > 0) \wedge (x^2 - 2x - 3 < 0)$

Previo: $x^2 - 2x - 3 = 0$ Disc: $(-2)^2 - 4*1*(-3) = 4 + 12 = 16 > 0$

$x = [-(-2) \pm \sqrt{16}] / 2*1$
$= [2 \pm 4] / 2$

$x_1 = [2+4] / 2 = 3$ v $x_2 = [2-4] / 2 = -1$

==> $x^2 - 2x - 3 = (x-3)(x+1)$

==> $(-x<0) \wedge (x-3)(x+1)>0$ (Caso 1) v $(-x>0) \wedge (x-3)(x+1) < 0$ (Caso 2)

$(-x<0) \wedge (x-3 >0) \wedge (x+1>0)$ v $(-x<0) \wedge (x-3 <0) \wedge (x+1<0)$

<==> $x>0 \wedge x>3 \wedge x>-1$ v $x>0 \wedge x< 3 \wedge x< -1$

<==> $S_1 =]3,+oo[\cup$ vacío $=]3,+oo[$

$(-x>0) \wedge (x-3>0) \wedge (x+1<0)$ v $(-x>0) \wedge (x-3<0) \wedge (x+1>0)$

<==> $x<0 \wedge x>3 \wedge x< -1$ v $x<0 \wedge x<3 \wedge x>-1$

<==> S_2 = vacío $\cup$ $]-1,0[=]-1,0[$

Por lo tanto, $S = S_1 \cup S_2 =]-1,0[\cup]3,+oo[$ (Fin)

8) $x^3 > x^2$
(Alonso)

Sol: $x^3 > x^2$
<==> $x^3 - x^2 > 0$
<==> $x^2 (x-1) > 0$
<==> $x^2 > 0$ ^ $(x-1>0)$ v $x^2 < 0$ ^ $(x-1<0)$
<==> $x!=0$ ^ $x>1$ v no existe x real.
<==> $x>1$

S=]1,+oo[

11) $(x-2)^2 / (x^2 -1) >= 0$

(Britney)

Sol: Restricción: $(x^2 - 1) != 0$ <==> $(x+1)(x-1) != 0$ <==> FALTA UN PASO <==> $x!= -1$ ^ $x!= 1$

$(x-2)^2 >= 0$ $x>=2$ v $x<2$

$x^2 - 1 = (x+1)(x-1) > 0$
<==> $(x+1>0)$ ^ $(x-1>0)$ v $(x+1<0)$ ^ $(x-1<0)$
<==> $x > -1$ ^ $x>1$ v $x< -1$ ^ $x<1$

S =]1,+oo[U]-oo,-1[