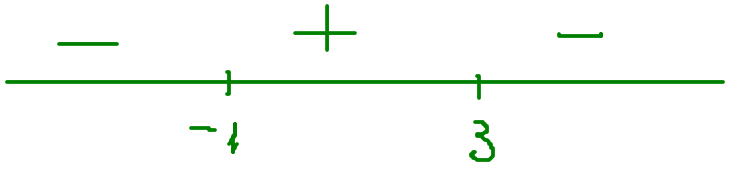
(25) b) $-x^2 + 2x + 3 \leq 0$

(1º) Resolver la ecuación $-x^2 + 2x + 3 = 0$

$-x^2 + 2x + 3 = 0$ es equivalente a $x^2 - 2x - 3 = 0$

$$x = \frac{2 \pm \sqrt{4+12}}{2} = \frac{2 \pm 4}{2} \begin{cases} 3 \\ -1 \end{cases}$$

(2º)



$x = -2$; $-(-2)^2 + 2(-2) + 3 = -5 < 0$

$x = 0$; $-0^2 + 2 \cdot 0 + 3 = 3 > 0$

$x = 4$; $-4^2 + 2 \cdot 4 + 3 = -5 < 0$

(3º) $(-\infty, -1] \cup [3, +\infty)$

Importante: Si cambio el signo de la inecuación cambia el sentido de la desigualdad y la inecuación que resulta es equivalente.

$-x^2 + 2x + 3 \leq 0$; $x^2 - 2x - 3 \geq 0$

25)

c) $x^2 - 2x - 7 > 5 - x$

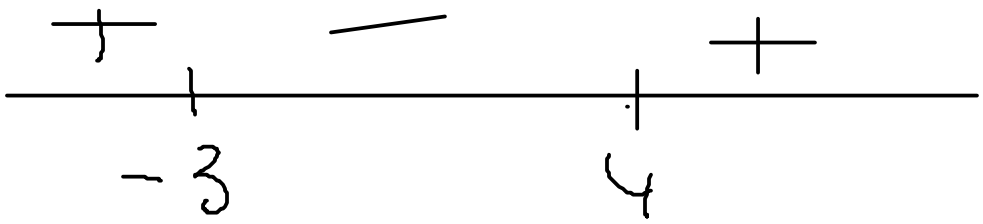
$x^2 - 2x - 7 - 5 + x > 0$

$x^2 - x - 12 > 0$

$x^2 - x - 12 = 0$

$x = \frac{1 \mp \sqrt{1 + 4 \cdot 12}}{2} = \frac{1 \mp \sqrt{49}}{2}$

$= \frac{1 \mp 7}{2} =$ $\frac{8}{2} = 4$; $\frac{-6}{2} = -3$



$x = -4; (-4)^2 - (-4) - 12 = 16 + 4 - 12 = 8 > 0$

$x = 0; 0^2 - 0 - 12 = -12 < 0$

$x = 5; 5^2 - 5 - 12 = 25 - 5 - 12 = 8 > 0$

$$(-\infty, -3) \cup (4, +\infty)$$

d)

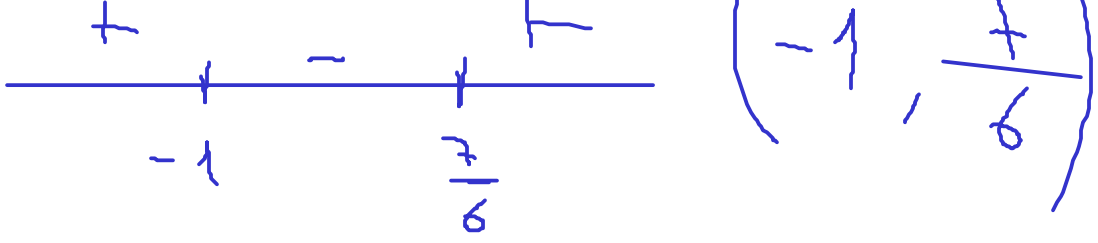
$$x^2 < \frac{x+7}{6}$$

$$\frac{6x^2}{6} < \frac{x+7}{6} \; ; \; 6x^2 < x+7$$

$$6x^2 - x - 7 < 0$$

$$6x^2 - x - 7 = 0$$

$$x = \frac{1 \pm \sqrt{1+168}}{12} = \frac{1 \pm 13}{12} \begin{cases} -1 \\ \frac{7}{6} \end{cases}$$



$$\left(-1, \frac{7}{6}\right)$$

$x = -2 \; ; \; 6 \cdot (-2)^2 - (-2) - 7 = 24 + 2 - 7 = 19 > 0$

$x = 0 \; ; \; 6 \cdot 0 - 0 - 7 = -7 < 0$

$x = 2 \; ; \; 6 \cdot (2)^2 - 2 - 7 = 24 - 2 - 7 = 15 > 0$

pág 62 nº 12.

a) $4^{x^2-2x-8} = \frac{1}{1024}$; $4^{x^2-2x-8} = 4^{-5}$

$1024 = 2^{10} = 4^5$

$4^5 = (2^2)^5 = 2^{10}$

$\rightarrow x^2-2x-8 = -5$; $x^2-2x-8+5=0$; $x^2-2x-3=0$

$\boxed{x=-1}$, $\boxed{x=3}$

b) $3^{2x-1} = \sqrt{27} \cdot 3^{2x-1} = 3^{\frac{3}{2}}$

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

$4x = 5$ / $\boxed{x = \frac{5}{4}}$ /

c) $2^{x+1} + 2^{x+3} = 320$

$2^x = t$

$2^x \cdot 2 + 2^x \cdot 2^3 = 320$

$2t + 8t = 320$; $10t = 320$; $t = 32$

$t = 32$; $2^x = 32$; $2^x = 2^5$; $\boxed{x = 5}$

d) $2{,}5^x = 49$

No puedo expresar los 2 miembros como potencias de la misma base. ¡Hay que tomar logaritmos!

$\log_{2,5} 2{,}5^x = \log_{2,5} 49$

$x \cdot \log_{2,5} 2{,}5 = \log_{2,5} 49$

$\log_{2,5} 2{,}5 = 1$

$\boxed{x = \log_{2,5} 49}$

9 a) $7x^4 = 63x^2$

$7x^4 - 63x^2 = 0$; $x^2(7x^2 - 63) = 0$

Si está incompleta no necesito hacer cambio de variable.

$x^2(7x^2 - 63) = 0$ ⟨

$x^2 = 0$; $\boxed{x = 0}$

$7x^2 - 63 = 0$; $7x^2 = 63$; $x^2 = 9$

$\boxed{x = \pm 3}$

b) $x^4 - 10x^2 + 9 = 0$; $\boxed{t = x^2}$

$t^2 - 10t + 9 = 0$;

$$t = \frac{10 \pm \sqrt{100 - 36}}{2} = \frac{10 \pm \sqrt{64}}{2} =$$

$$= \frac{10 \pm 8}{2} \begin{cases} \nearrow 9 \\ \searrow 1 \end{cases}$$

$t = 9$; $x^2 = 9$; $\boxed{x = \pm 3}$

$t = 1$; $x^2 = 1$; $\boxed{x = \pm 1}$