EJERCITACIÓN FINAL

1) $3x^3 - 7x^2 + 2x = 0$

$x(3x^2 - 7x + 2) = 0$

$3x^2 - 7x + 2 = \frac{0}{x} \quad (\exists \neq 0)$

$3x^2 - 7x + 2 = 0 \qquad a=3 \quad b=-7 \quad c=2$

$x_{1;2} = \frac{+(-7) \pm \sqrt{(-7)^2 - 4 \cdot 3 \cdot 2}}{6}$

$x_{1;2} = \frac{7 \pm \sqrt{49 - 24}}{6}$

$x_{1;2} = \frac{7 \pm 5}{6}$

$x = \frac{7+5}{6} = \boxed{2}$

$x = \frac{7-5}{6} = \boxed{\frac{1}{3}}$

$S = \{2; \frac{1}{3}\}$

2) $(2x-4) \cdot (3-x) \geq 0$

$2x - 4 \geq 0$

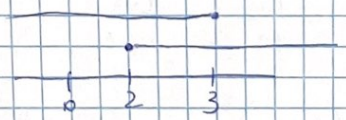
$2x \geq 4$

$\boxed{x \geq 2}$

$3 - x \geq 0$

$-x \geq -3$

$\boxed{x \leq 3}$



$S = [2; 3]$

3) $z = 2 - i \quad w = 4 + 3i \quad u = 4 \text{cis}(25°) \quad v = 3 \text{cis}(35°)$

a) $z \cdot w = (2-i) \cdot (4+3i) = 8 + 6i - 4i - 3i^2 = -3i^2 + 2i + 8 =$

$-3(-1) + 2i + 8 = \boxed{11 + 2i}$ ✓

b) $\frac{z}{w} = \frac{(2-i)}{(4+3i)} = \frac{(2-i) \cdot (4-3i)}{(4+3i) \cdot (4-3i)} = \frac{8 - 6i - 4i + 3i^2}{16 - 12i + 12i + 9i^2} = \frac{8 - 10i - 3}{16 - 9} =$

$\frac{-10i + 5}{7} = \boxed{\frac{-10}{7}i + \frac{5}{7}}$ ✓

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c) $w^5 \cdot v^3 = [4cis(25°)]^5 \cdot [3cis(35°)]^3$

$= 1024cis(125°) \cdot 27cis(105°)$

$= 27648cis(230°)$

4) L1: $(0,3); (6,0)$

$m = \frac{\Delta y}{\Delta x} = \frac{3-0}{6-0} = \frac{3}{6} = \frac{1}{2}$

$\boxed{m = -\frac{1}{2}}$ L: $y = -\frac{1}{2}x + b$ $(0,3)$

$3 = \frac{1}{2} \cdot 0 + b$

$\boxed{b = 3}$

RTA: $\boxed{y = -\frac{1}{2}x + 3}$ ✓

C2:

$x_0 = 2$

$y_0 = 1$

$R = 2$

$\boxed{C(2,1); R: (x-2)^2 + (y-1)^2 = (2)^2}$ ✓

E3:

$x_0 = 2 \quad a = 1$

$y_0 = 2 \quad b = 2$

$\frac{(x-2)^2}{1^2} + \frac{(y-2)^2}{2^2} = 1$

$x = 2 + 1 \cdot \cos(t)$

$y = 2 + 2 \cdot \sin(t) \quad 0° \leq t \leq 270°$

5)

$$\underbrace{\begin{vmatrix} 4+x & -2 \\ 3+x & -2 \end{vmatrix}}_{A} = \underbrace{\begin{vmatrix} -2 & 3 & 1 \\ 1 & -1 & 2 \\ 4 & 0 & 2 \end{vmatrix}}_{B}$$

$A = (4+x)\cdot(-2) + (-2)\cdot(3+x) = -8 - 2x - 6 + 2x = \boxed{-2}$

$B = 3 \cdot 2 \cdot 4 + (-2) \cdot (+1) \cdot 2 + 1 \cdot 0 \cdot 1 - 1 \cdot 3 \cdot 2 - 4 \cdot (-1) \cdot 1 - 0 \cdot 2 \cdot (-2)$

$B = 24 + 4 + 0 - 6 + 4 + 0$

$B = \boxed{26}$

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6) $(3)\begin{bmatrix} 2+x & 3-y \\ 4z & 2-w \end{bmatrix} + (2)\begin{bmatrix} 2x & 1-y \\ -z & 1+w \end{bmatrix} = (3)\begin{bmatrix} 1 & -2 \\ 3 & -4 \end{bmatrix}$

$\begin{bmatrix} 6+3x & 9-3y \\ 12z & 6-3w \end{bmatrix} + \begin{bmatrix} 4x & 2-2y \\ -2z & 2+2w \end{bmatrix} = \begin{bmatrix} 3 & -6 \\ 9 & -12 \end{bmatrix}$

$\begin{bmatrix} 6+7x & 11-5y \\ 10z & 8-w \end{bmatrix} = \begin{bmatrix} 3 & -6 \\ 9 & -12 \end{bmatrix}$

$6+7x=3 \wedge 11-5y=-6 \wedge 10z=9 \wedge 8-w=-12$

$7x=3-6 \wedge -5y=-17 \wedge \boxed{z=\frac{9}{10}} \wedge -w=-20$

$\boxed{x=-\frac{3}{7}}$ $\quad \boxed{y=-\frac{17}{5}}$ $\quad \boxed{w=20}$

7) $\begin{cases} 4x-y=2 \\ 3x-2y=-1 \end{cases}$

$\Delta = \begin{vmatrix} 4 & -1 \\ 3 & -2 \end{vmatrix} = -8+3=-5$

$\Delta_x = \begin{vmatrix} 2 & -1 \\ -1 & -2 \end{vmatrix} = -4-1=-5$

$\Delta_y = \begin{vmatrix} 4 & 2 \\ 3 & -1 \end{vmatrix} = -4-6=-10$

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

$y = \frac{-10}{-5} = 2$

$S=\{1;2\}$

8) a) $P(x)=x^3+4x^2-11x+m$

$3^3+4\cdot 3^2-11\cdot 3+m=0$

$27+36-33+m=0$

$30+m=0$

$\boxed{m=-30}$

b)

9) $5(2^x)^2 - 4(2^x) - 1 = 0$ SE RESUELVE COMO CUADRÁTICA

$a = 5 \quad b = -4 \quad c = -1$

$$2^x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 5 \cdot (-1)}}{10}$$

$$2^x = \frac{4 \pm \sqrt{16 + 20}}{10}$$

$$2^x = \frac{4 \pm 6}{10}$$

$\frac{4+6}{10} = 1$

$\frac{4-6}{10} = -\frac{2}{10} = -\frac{1}{5}$

$2^x = 1$ ✓ $\quad 2^x = -\frac{1}{5}$

NO PUEDO SER EXPONENCIAL

BUSCAR MISMA BASE

10) $\text{Dom}(F(x))$ Y CONJ POS.

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

Dom

divisor $\neq 0$

$2 + x \neq 0$

$x \neq -2$

$\text{Dom}(F) = \mathbb{R} - \{-2\}$

CP

$F(x) > 0$

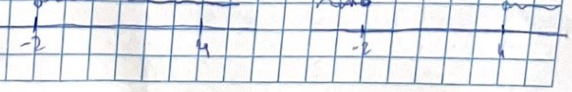
$\frac{4-x}{2+x} > 0$

$(4 + x > 0 \wedge 2 + x > 0) \vee (4 - x < 0 \wedge 2 + x < 0)$

$(-x > -4 \wedge x > -2) \vee (-x < -4 \wedge x < -2)$

$(x < 4 \wedge x > -2) \vee (x > 4 \wedge x < -2)$

$CP(F) = (-2, 4)$



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11)

$$\log(4x+1) + \log(x+3) = \log(45)$$

$$\log[(4x+1)\cdot(x+3)] = \log(45)$$

$$(4x+1)\cdot(x+3) = 45$$

$$4x^2 + 12x + x + 3 = 45$$

$$4x^2 + 13x - 42 = 0 \qquad a=4 \quad b=13 \quad c=-42$$

$$x = \frac{-13 \pm \sqrt{13^2 - 4\cdot4\cdot(-42)}}{8}$$

$$x = \frac{-13 \pm \sqrt{169 + 672}}{8}$$

$$x = \frac{-13 \pm \sqrt{841}}{8}$$

$$x = \frac{-13+29}{8} = 2$$

$$x = \frac{-13-29}{8} = -\frac{42}{8} = -\frac{21}{4}$$

HAY DOS POSIBLES SOLUCIONES PERO PUEDEN PRODUCIR ARGUMENTOS POSITIVOS.

$x = 2 \rightarrow$ Arg1 $= 4x+1 = 4\cdot2+1 = 9 > 0$ ✓

Arg2 $= x+3 = 4+3 = 7 > 0$ ✓

ES

$S = \{2\}$

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$x < 0$

$x < -2$

$x < -2$