$$\begin{cases} 2x + 7y - 3z - 2w = 5 \\ x + 3y - z - w = 2 \\ x + 2y + 0z - w = 1 \end{cases}$$

$$\left(\begin{array}{cccc|c} 2 & 7 & -3 & -2 & 5 \\ 1 & 3 & -1 & -1 & 2 \\ 1 & 2 & 0 & -1 & 1 \end{array}\right)$$

$F1 \leftrightarrow F2$

$$\left(\begin{array}{cccc|c} 1 & 3 & -1 & -1 & 2 \\ 2 & 7 & -3 & -2 & 5 \\ 1 & 2 & 0 & -1 & 1 \end{array}\right)$$

$$\begin{array}{c} \\ -2 \cdot F1 + \widetilde{F2} \\ -1 \cdot F1 + \widetilde{F3} \end{array} \left(\begin{array}{cccc|c} 1 & 3 & -1 & -1 & 2 \\ 0 & 1 & -1 & 0 & 1 \\ 0 & -1 & 1 & 0 & -1 \end{array}\right)$$

$$\begin{array}{c} -3 \cdot F2 + \widetilde{F1} \\ \\ F2 + \widetilde{F3} \end{array} \begin{array}{c} \begin{array}{cccccc} x & y & z & w & \end{array} \\ \left(\begin{array}{cccc|c} 1 & 0 & 2 & -1 & -1 \\ 0 & 1 & -1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right) \end{array}$$

$$\begin{cases} x + 2z - w = -1 \rightarrow x = -1 - 2z + w \\ y - z = 1 \rightarrow y = 1 + z \end{cases}$$

$$S = \{ (-1 - 2z + w, 1 + z, z, w), z, w \in \mathbb{R} \}$$

$|z-1| = 2$

$Arg(z-2-i) = -\frac{\pi}{2}$ → $a=0$ $\quad b<0$

$a+bi-2-i = -\frac{\pi}{2}$

$(a-2)+(b-1)i = -\frac{\pi}{2}$

$a-2=0 \qquad b-1<0$

$a=2 \qquad b<1$

$a+bi$

$|z-1| = 2$ $\qquad a \quad b$

$|a+bi-1| = 2$

$|(a-1)+b| = 2$

$(a-1)^2+b^2 = 2^2$

$(2-1)^2+b^2 = 4$

$1+b^2 = 4 \qquad b<1$

$b^2 = 3$

$b = \pm\sqrt{3}$, $\qquad b = -\sqrt{3}$

R/ $\boxed{2-i\sqrt{3}}$

$x^4 + 3x^3 + 5x^2 + 4x + 2$, $i-1$ es un 0

$-i-1$ es el otro

$$\begin{array}{ccccc|c}
1 & 3 & 5 & 4 & 2 & \\
 & i-1 & -3+i & -3+i & -2 & i-1 \\
\hline
1 & 2+i & 2+i & 1+i & 0 & (x-(i-1))
\end{array}$$

$(2+i)(i-1)$

$2i - 2 + i^2 - i$

$i - 2 - 1$

$-3+i$

$(1+i)(i-1)$

$\cancel{i} - 1 + i^2 \cancel{-i}$

$-1-1$

-2

$x^3 + (2+i)x^2 + (2+i)x + (1+i)$

$$\begin{array}{cccc|c}
1 & 2+i & 2+i & 1+i & \\
 & -1-i & -1-i & -1-i & -1-i \\
\hline
1 & 1 & 1 & 0 & (x-(-1-i))
\end{array}$$

$$x^2 + x + 1 = \left(x - \frac{-1+\sqrt{3}\,i}{2}\right)\left(x - \frac{-1-\sqrt{3}\,i}{2}\right)$$

$$\boxed{\frac{-1+\sqrt{3}\,i}{2} \qquad \frac{-1-\sqrt{3}\,i}{2} \qquad -1-i \qquad -1+i}$$

Rectangular

Exprese $(-1-i)^i$ en forma a+bi

$z = (-1-i)^i$

$\ln(z) = i\ln(-1-i)$

$z = -1-i$

$r = \sqrt{(-1)^2+(-1)^2} = \sqrt{2}$

$\theta = \arctan\left(\frac{-1}{-1}\right) - \pi = \frac{-3\pi}{4}$

$z = \sqrt{2} \cdot e^{-\frac{3\pi}{4}i}$

$i\ln\left(\sqrt{2} \cdot e^{-\frac{3\pi}{4}i}\right)$

$i\left[\ln(\sqrt{2}) + \cancel{\ln(e)}^{-\frac{3\pi}{4}i}\right]$

$i\left[\ln(\sqrt{2}) - \frac{3\pi}{4}i\right]$

$\ln(\sqrt{2})i + \frac{3\pi}{4}$

$e^{\frac{3\pi}{4}} \cdot \cos(\ln(\sqrt{2}))$

$e^{\frac{3\pi}{4}} \cdot [\cos(\ln(\sqrt{2})) + i\,\mathrm{sen}(\ln(\sqrt{2}))]$

$$\boxed{9{,}923400227 + 3{,}583839621i}$$

x) $P(x) = -2x^4 + 6x^3 - 13x^2 + 14x - 10$ sabiendo que $x - (1+i)$ es un factor de $P(x)$.

$$
\begin{array}{ccccc|c}
-2 & 6 & -13 & 14 & -10 & \\
 & -2-2i & 6+2i & -9-5i & 10 & 1+i \\
\hline
-2 & 4-2i & -7+2i & 5-5i & 0 & (x-(1+i))
\end{array}
$$

$-2x^3 + (4-2i)x^2 + (-7+2i)x + (5-5i)$

$(4-2i)(1+i)$

$4 + 4i - 2i - 2i^2$

$4 + 2i + 2$

$6 + 2i$

$$
\begin{array}{cccc|c}
-2 & 4-2i & -7+2i & 5-5i & \\
 & -2+2i & 2-2i & -5+5i & 1-i \\
\hline
-2 & 2 & -5 & 0 & (x-(1-i))
\end{array}
$$

$(-7+2i)(1+i)$

$-7 - 7i + 2i + 2i^2$

$-7 - 5i - 2$

$-9 - 5i$

$-2x^2 + 2x - 5$

$$\left(x - \frac{1+3i}{2}\right)\left(x - \frac{1-3i}{2}\right)$$

$(5-5i)(1+i)$

$5 + \cancel{5i} - \cancel{5i} - 5i^2$

$5 + 5$

10

$$\left(x - \frac{1+3i}{2}\right)\left(x - \frac{1-3i}{2}\right)(x-(1+i))(x-(1-i))$$