1) $\frac{4z-2}{z+5} = 10-7i$ ← Numero complejo

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$4z-2 = (10-7i)(z+5)$

$4z-2 = (10-7i)z + (10-7i)5$

$4z - (10-7i)z = 50-35i+2$

$z(4-10-7i) = 52-35i$

$z(-6-7i) = 52-35i$

$z = \frac{52-35i}{-6+7i}$

$z = \frac{-557}{85} - \frac{154}{85}i$

1) $f(z) = 3z^2 - 5z + i \qquad z = x + iy$

$$f(x+iy) = 3(x+iy)^2 - 5(x+iy) + i$$
$$= 3(x^2 + 2ixy + (iy)^2) - 5x - 5iy + i$$
$$= 3x^2 + 6ixy - 3y^2 - 5x - 5iy + i$$
$$= \underbrace{(3x^2 - 3y^2 - 5x)}_{u(x,y)} + \underbrace{(6xy - 5y + 1)i}_{v(x,y)}$$

$$\frac{\partial u}{\partial x} = \frac{\partial}{\partial x}(3x^2 - 3y^2 - 5x) = 6x - 5 \qquad \frac{\partial v}{\partial y} = \frac{d}{dy}(6xy - 5y + 1)\ 6x - 5$$

$$\frac{\partial u}{\partial y} = \frac{\partial}{\partial y}(3x^2 - 3y^2 - 5x) = -6y \qquad \frac{\partial v}{\partial x} = \frac{\partial}{\partial x}(6xy - 5y + 1)\ +6y$$

$\therefore$ Derivable, Analitica.

$$f'(z) = (3z^2 - 5z + i)$$
$$f'(z) = (6z^2 - 5)$$

$(1-i)^{4i}$

$1-i = |1-i| = \sqrt{1+1} = \sqrt{2}$

$\theta = \tan^{-1}\left(\frac{-1}{1}\right) = \frac{\pi}{4}$

$e^{4i(\ln(1-i))}$

$= e^{4i(\ln\sqrt{2} + -i\pi/4)}$

$= e^{4i \ln 2^{1/2} + i\pi/2}$

$= e^{4i/2 \ln(2) + \pi/4}$

$= e^{2i(\ln(2))} \cdot e^{+\pi/4}$

$(1-i)^{4i} = [\cos(2\ln(2)) + i\,\text{sen}(2\ln(2))]\, e^{-\pi/4}$

$\cosh^{-1}(3i) =$

$\cosh^{-1}(3i) = \ln(3i + \sqrt{(3i)^2+1}$

$= \ln(3i + \sqrt{-9+1})$

$= \ln(3i + \sqrt{-8})$

$= \ln(3i + 2\sqrt{2}\,i)$

$= \ln(3 + 2\sqrt{2}\,i)$

$= \ln(3+2\sqrt{2}) + i\left(\frac{\pi}{2} + 2k\pi\right)$

$r = 3 + 2\sqrt{2}$

$\theta = \frac{\pi}{2}$

$\therefore$

$\cosh^{-1}(3i) = \ln(3+2\sqrt{2}) + i\frac{\pi}{2}$

$|z - 4i| = |z + 5| \qquad z = x + iy$

$|x + iy - 4i| = |x + iy + 5|$

$|x + i(y - 4)| = |(x + 5) - iy|$

$\sqrt{x^2 + (y-4)^2} = \sqrt{(x+5)^2 + y^2}$

$\cancel{x^2} + \cancel{x^2} - 8y + 16 = \cancel{x^2} + 10x + 25 + \cancel{y^2}$

$-8y + 16 = 10x + 25$

$-8y = 10x + 9$

$y = \dfrac{10x + 9}{-8}$ recta

5) $\sqrt{\dfrac{i^{48} - i^{24}}{i^7 - 3}}$

$= \sqrt{\dfrac{1 - 1}{-i - 3}}$

$= \sqrt{\dfrac{0}{-i-3}} = \underline{0}$

$i^{48} = i^0$

$i^{48} = \underline{1}$

$i^{24} = i^0$

$i^{24} = \underline{1}$

$48 \div 4 = 12$; $48 - 48 = 0$

$24 \div 4 = 6$; $24 - 24$

i^7

$7 \div 4 = 1$; $7 - 4 = 3$

$i^7 = -i$