where $x \in \mathbb{R}$, $y \in (-\pi, \pi]$. by defn of Log, hence Log is a one-one function with image $x+iy$, $x \in \mathbb{R}$, $y \in (-\pi, \pi]$. and Log^{-1} is a one-one function with domain $\{x+iy : x \in \mathbb{R}, y \in (-\pi, \pi]\}$ and rule $g^{-1}(x+iy) = \exp(x+iy)$

$$iz - 3 = \exp(x+iy)$$
$$iz = 3 + \exp(x+iy)$$
$$z = -3i - i\exp(x+iy).$$
$$= -3i - ie^{x}(\cos y + i\sin y)$$
$$= e^{x}\sin y - i(3 + e^{x}\cos y).$$

$\frac{3}{4}$ A, M

$z = g^{-1}(x+iy) = e^{x}\sin y - i(3 + e^{x}\cos y)$ ✓

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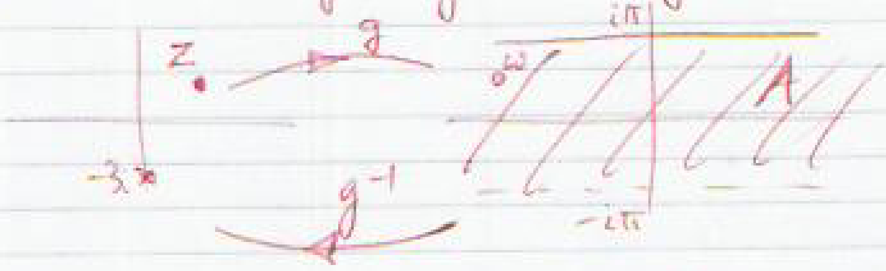
and the domain of g^{-1} $\{z : -\pi < \operatorname{Im} z \leq \pi\}$

Notice that we've no need to use $x+iy$ form.

Simply note that the image of g is the same as that of Log namely $A = \{w : -\pi < \operatorname{Im} w \leq \pi\}$



For $w \in A$, $w = g(z)$ provided $w = \operatorname{Log}(iz-3)$

$$\therefore \quad iz - 3 = e^{w}$$
$$\therefore \quad z = -i(e^{w}+3)$$

$\therefore$ ~~dom~~ i.e. we have a unique z with $g(z) = w$

$$\therefore \quad g^{-1}(w) = -i(e^{w}+3)$$