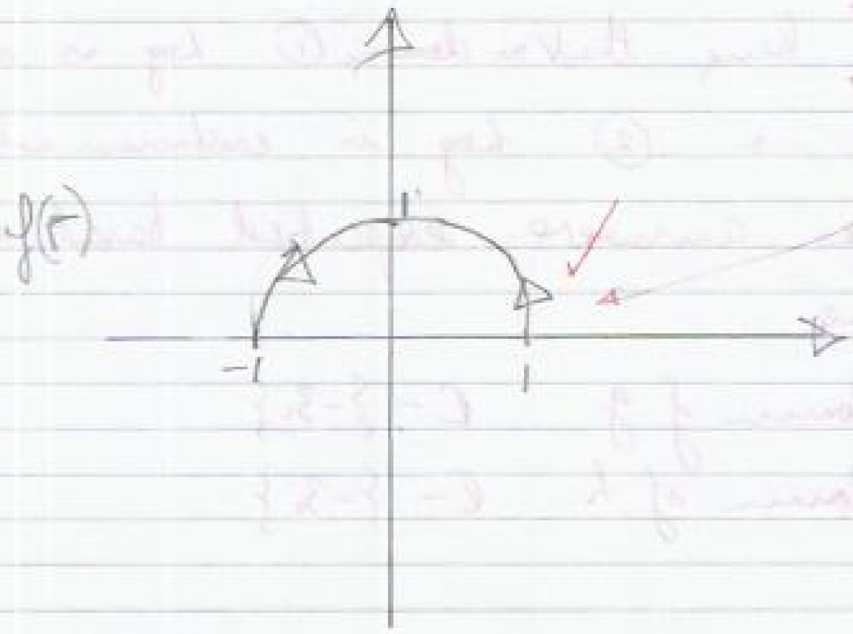
Initially $t = -\pi/2$
$\gamma(-\pi/2) = 1 + 2e^{-\pi i/2} = 1 - 2i$
Finally $t = \pi/2$
$\gamma(\pi/2) = 1 + 2e^{\pi i/2} = 1 + 2i$

As a check
$f(t) = 1 + 2e^{it}$ $t \in [-\pi/2, \pi/2]$
$f(z) = \frac{i}{2}(z-1)$
$\therefore f(\gamma(t)) = \frac{i}{2}(1 + 2e^{it} - 1)$
$= ie^{it}$ $t \in [-\pi/2, \pi/2]$
$= e^{i(t+\pi/2)}$ $t \in [-\pi/2, \pi/2]$
$= e^{it}$ $t \in [0, \pi]$

iii)



3A

Initial point is $f(\gamma(-\pi/2))$
$= f(1-2i) = \frac{1}{2}i(1-2i-1)$
$= \frac{1}{2}i(-2i) = 1$

Final point is $f(\gamma(\pi/2))$
$= f(1+2i) = \frac{1}{2}i(1+2i-1)$
$= \frac{1}{2}i(2i) = -1.$

10 1A

iv) The standard parametrization of $f(\Gamma)$ is $\gamma_1(t) = e^{it}$, $t \in [0, \pi]$
$f(1+2e^{it}) = \frac{i}{2}(1+2e^{it}-1) = ie^{it}, t \in [-\pi/2, \pi/2] = e^{it}, t \in [0, \pi]$

b) $f(z) = \exp(iz - 3)$
The function exp is entire: domain of f is $\mathbb{C}$.

$g(z) = \mathrm{Log}(iz - 3)$
Log x is defined on $\mathbb{C} - \{x : x \leq 0\}$
$\therefore g(z)$ is defined on $\mathbb{C} - \{y : (iy - 3) \leq 0\}$
ie $\mathbb{C} - \{y : -3 \leq y\}$ is domain of g

PTO

3A

$h(z) = (iz - 3)^{4i}$
$= \exp(4i\,\mathrm{Log}(iz - 3))$
For $h(z)$ to be well defined we must have that $iz - 3$ is in domain of Log ie $z \in \mathbb{C} - \{y : -3 \leq y\}$. Then