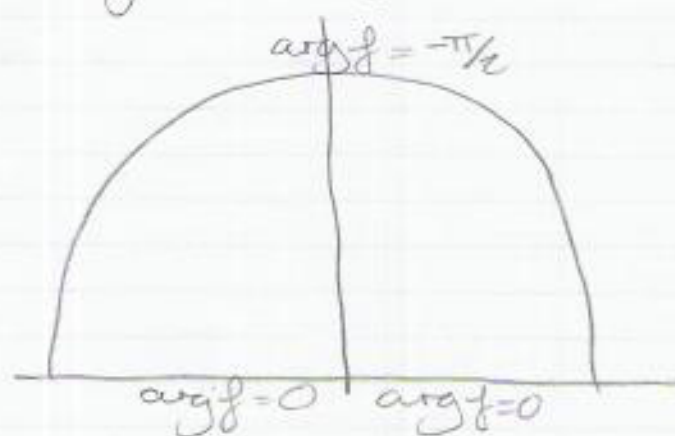
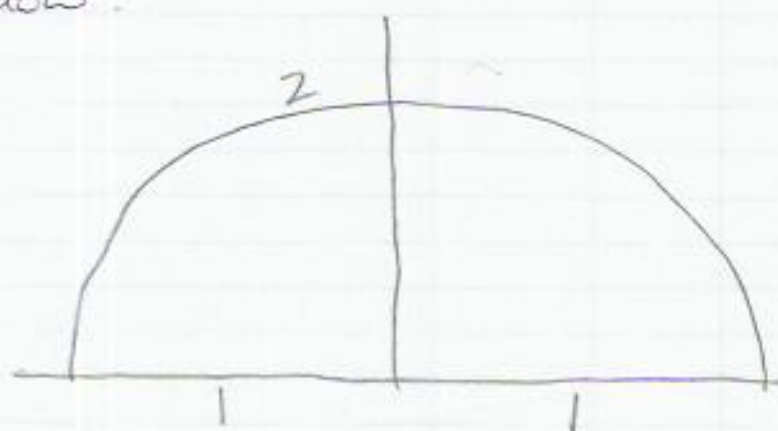


②

Since f is again +ve



From here we can construct the function which takes the values shown below.



take $g(w) = 1 - \frac{2}{\pi} \arg(f(w))$ ✓

Then on the x axis $\arg(f(w)) = 0$ so $g = 1$

and on upper circle, $\arg(f(w)) = -\pi/2$

so $g(w) = 1 - \frac{2}{\pi} \times \frac{\pi}{2} = 2$

Then the required function is $g(z) = 1 - \frac{2}{\pi} \arg(f(w(z)))$

$$= 1 - \frac{2}{\pi} \arg\left(\frac{1-z^3}{1+z^3}\right)$$

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But how do you know the function is harmonic?

[Because ^(briefly) $\arg = \text{Imag}(\log)$, and \log is analytic in D.]