Ang 2020, Q1  
We know that of 
$$P(Z)$$
 and  $Q(Z)$   
are polys and  
1)  $deg(Q(Z)) \ge deg(P(Z)) + 2$   
2)  $Q(Z)$  has no zeroes on  $R$ 

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$$deg(Q(z)) \ge deg(P(z)) + 2$$

2)  $Q(z)$  has no zeroed on  $R$ 

then
$$\int_{-\infty}^{\infty} \frac{P(x)}{Q(x)} dx = 2\pi i \ge Res_{\alpha} \frac{P}{Q}$$
also
$$also$$

then
$$\int_{-\infty}^{\infty} \frac{P(z)}{Q(x)} dx = 2\pi i \sum_{a \in S} Res_a \frac{P}{Q}$$

$$zeroes \ d \ Q \ M \ UHP.$$

$$\chi^2 + 1 = 0 \implies \chi = \pm i$$

$$\chi^2 + 4 = 0 \implies \chi = \pm 2i$$

$$Lef \ Q(z) = (z^2 + 1)(z^2 + 4)$$

$$Q'(z) = (z^2 + 1)(2z) + (z^2 + 4)(2z)$$

$$Q'(i) = (-1 + 4)(2i) = 6i$$

Q'(2i) = (-4+1)(4i) = -12i

$$3-i/1$$

$$= 2\pi \left( \frac{2-1}{2} \right)$$

 $=\frac{\pi}{6}$ 

$$= 2\pi \left( \frac{2-1}{12} \right)$$

$$=2\pi\left(\begin{array}{c}2-1\\12\end{array}\right)$$

$$=2\pi\left(\begin{array}{c}2-1\\12\end{array}\right)$$

$$= 2\pi / 2 - 1$$

$$= 2\pi \left( \frac{2-1}{2} \right)$$

$$R\pi i \left( \frac{1}{6i} \right)$$

$$2\pi i \left( \frac{1}{6i} - \frac{1}{12i} \right)$$