



$$\left\{ \begin{array}{l} \text{rational } \gamma = xp/xq \\ x \in \mathbb{R} \Rightarrow xq \neq 0 \\ \deg q - \deg p \geq 2 \end{array} \right. \Rightarrow \int_{dx/2\pi}^{\mathbb{R}} \gamma = i \sum_{z \in \mathcal{I} > 0} \text{Res } \gamma$$

$$z \gamma z^2 \rightsquigarrow A \in \mathbb{C} \Rightarrow \sup_{z \in \mathbb{C}^R} \frac{O}{z \gamma z^2} \leq M \Rightarrow \int_{dz/\pi}^{\overline{\exp(\varepsilon i) R} \exp(-\varepsilon i) R} z \gamma \leq R \frac{M}{R^2} = \frac{M}{R} \underset{R \nearrow \infty}{\rightsquigarrow} 0$$

$$z^4 + a^4 = (z^2 + ia^2)(z^2 - ia^2) = \left(z + a \frac{1-i}{\sqrt{2}}\right) \left(z - a \frac{1-i}{\sqrt{2}}\right) \left(z + a \frac{1+i}{\sqrt{2}}\right) \left(z - a \frac{1+i}{\sqrt{2}}\right)$$

$$\int_{dx/\pi}^{\mathbb{R}_+} \stackrel{\text{ev}}{=} \int_{dx/2\pi}^{\mathbb{R}} \left\{ \begin{array}{l} \frac{1}{x^4 + a^4} = i \left\{ \begin{array}{l} \text{Res } \frac{1}{z^4 + a^4} = \frac{1}{4z^3} = -\frac{z}{4} \\ a \exp(\pi i/4) = a \frac{i+1}{\sqrt{2}} : a \exp(3\pi i/4) = a \frac{i-1}{\sqrt{2}} \end{array} \right. = -\frac{i}{4} a \frac{i+1+i-1}{\sqrt{2}} = \frac{a}{2\sqrt{2}} \\ \frac{1}{x^4 + 1} = \frac{1}{2\sqrt{2}} \\ \frac{1}{x^6 + 1} = i \left\{ \begin{array}{l} \text{Res } \frac{1}{z^6 + 1} = \frac{1}{6z^5} = -\frac{z}{6} \\ \exp(\pi i/6) : \exp(\pi i/2) = i : \exp(5\pi i/6) = -\exp(-\pi i/6) \end{array} \right. = -\frac{i}{6} (\exp(\pi i/6) + \exp(\pi i/2)) \end{array} \right.$$

$$\int_{dx/\pi}^{\mathbb{R}_+} \frac{1}{x^n + 1} = \frac{1}{n \sin(\pi/n)}$$

$$\int_{dx/\pi}^{\mathbb{R}} \frac{x^2}{x^4 + 1} = i \left\{ \begin{array}{l} \text{Res } \frac{z^2}{z^4 + 1} = \frac{z^2}{4z^3} = \frac{1}{4z} \\ \exp(\pi i/4) = \frac{i+1}{\sqrt{2}} : \exp(3\pi i/4) = \frac{i-1}{\sqrt{2}} \end{array} \right. = \frac{i}{4} (\exp(-\pi i/4) + \exp(-3\pi i/4)) = \frac{i}{4} \frac{1-i-i-1}{\sqrt{2}} = \frac{1}{2\sqrt{2}}$$

$$\int_{dx/\pi}^{\mathbb{R}} \frac{x^2}{(1+x^2)(4+x^2)} = \frac{1}{3}$$

$$\int_{dx/\pi}^{\mathbb{R}_+} \stackrel{\text{ev}}{=} \int_{dx/2\pi}^{\mathbb{R}} \left\{ \begin{array}{l} \frac{1}{(a+bx^2)^n} \\ \frac{1}{(1+x^2)^2} \end{array} \right. = \frac{1}{4}$$

$$\int_{dx}^{\mathbb{R}_+} \frac{x^2}{(x^2+a^2)^2} =$$

$$\int_{dx}^{\mathbb{R}} \frac{1}{x^4 - 2x^3 + 3x^2 - 2x + 2} = \int_{dx}^{\mathbb{R}} \frac{1}{P(x)}$$

$$\int_{dx}^{\mathbb{R}} \frac{1}{x^4 + x^2 + 1} =$$

$$e^{\pi i/3} = \frac{1 + i\sqrt{3}}{2}$$