

HU 13

$$1) \quad \frac{\pi}{4} = \underbrace{4 \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} \dots \right)}$$

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7}$$

$$1) \quad 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \frac{1}{15} + \frac{1}{17} - \frac{1}{19}$$

$$2) \quad \arctan x + \arctan y = \arctan \left(\frac{x+y}{1-xy} \right)$$
$$= \arctan \left(\frac{\frac{1}{2} + \frac{1}{3}}{1 - (\frac{1}{2})(\frac{1}{3})} \right) = 1$$

$$2) \quad x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$$

$$3) \quad \frac{\pi}{4} = 4 \arctan \frac{1}{5} = \arctan \frac{1}{239}$$

$$\downarrow$$
$$\arctan \frac{1}{5} + \arctan \frac{1}{5} + \arctan \frac{1}{5} + \arctan \frac{1}{5}$$

$$\arctan \frac{1 \cdot 5 + 1 \cdot 5 + 1 \cdot 5 + 1 \cdot 5}{5 \cdot 5 \cdot 5 \cdot 5 - 1 \cdot 1 \cdot 1 \cdot 1} = \arctan \frac{20}{624}$$

$$- \arctan \frac{1}{239}$$

$$\arctan \frac{20}{624} - \arctan \frac{1}{239}$$

$$4) 13 - \left(\frac{1}{2}\right)^5 \frac{20 \cdot 50 + 13}{2^{10}} + \left(\frac{1 \cdot 3}{2^{04}}\right) + \dots = \frac{128}{\pi^2}$$