

EXACT VALUES OF VACUUM PARAMETERS ...

$$\varepsilon_0 = 8.854187817 \times 10^{-12} \text{ F/m}$$

$$\mu_0 = 4 \pi \times 10^{-7} \text{ H/m}$$

$$c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}} = 299792458 \text{ m/s}$$

$$\eta = \sqrt{\frac{\mu_0}{\varepsilon_0}} = 376.73 \text{ } \Omega$$

... AND APPROXIMATE VALUES

The approximation is indeed very good!

$$\varepsilon_0 \cong \frac{1}{36 \pi} \times 10^{-9} \text{ F/m}$$

$$\mu_0 = 4 \pi \times 10^{-7} \text{ H/m}$$

$$c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}} \cong \frac{1}{\sqrt{4 \pi \times 10^{-7} \frac{1}{36 \pi} \times 10^{-9}}} = 3 \times 10^8 \text{ m/s}$$

$$\eta = \sqrt{\frac{\mu_0}{\varepsilon_0}} \cong \sqrt{\frac{4 \pi \times 10^{-7}}{\frac{1}{36 \pi} \times 10^{-9}}} = 120 \pi \text{ } \Omega$$