

Solution

MATH 114, Section 003

Quiz 10

RCT session April 9, 2018.

Determine whether or not the following series is convergent:

$$S = \sum_{n=2}^{\infty} \left(\frac{\pi}{4}\right)^n.$$

If it is convergent, find its sum.

$$\begin{aligned} S &= \left(\frac{\pi}{4}\right)^2 + \left(\frac{\pi}{4}\right)^3 + \left(\frac{\pi}{4}\right)^4 + \dots \\ &= \left(\frac{\pi}{4}\right)^2 \left(1 + \left(\frac{\pi}{4}\right) + \left(\frac{\pi}{4}\right)^2 + \dots\right) \end{aligned}$$

geometric series w $a = \left(\frac{\pi}{4}\right)^2$ & $r = \frac{\pi}{4}$

So S is convergent.

$$\& S = \left(\frac{\pi}{4}\right)^2 \left(\frac{1}{1 - \frac{\pi}{4}}\right)$$

$$= \frac{\left(\frac{\pi}{4}\right)^2}{1 - \frac{\pi}{4}}$$

$$\left(= \frac{\pi^2}{16 - 4\pi} \right)$$