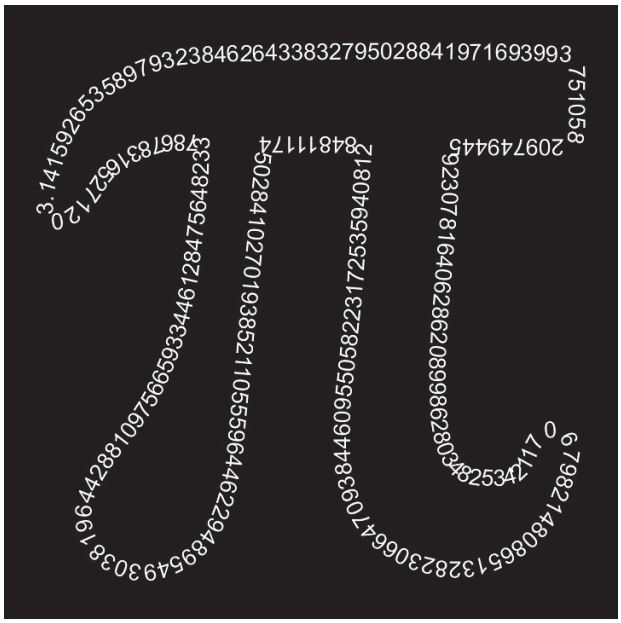
# MATHS BASIC COURSE FOR UNDERGRADUATES





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**EXERCISES. STATEMENTS: MATHEMATICAL LANGUAGE**

**Exercise 1.** *Let $S$ be the set of all prime numbers. Prove that $S$ is an infinite set. ($p \Longrightarrow q$).*

**Exercise 2.** *Let $p$ be the proposition: an integer number $n$ is divisible by $6$ and by $4$, and let $q$ be the proposition: an integer number $n$ is divisible by $24$. Does $p$ proposition imply $q$ proposition?*

**Exercise 3.** *Prove the following $p$ statement:*

$$\text{for any } n \in \mathbb{N}, 2^n \leq 2^{n+1}$$

**Exercise 4.** *Using the induction method, prove the following statement:*

$$\text{for any } n \in \mathbb{N}, 1.1! + 2.2! + 3.3! + \ldots + n.n! = (n+1)! - 1.$$