

# PINGALA ASSIGNMENTS

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## CONTENTS

### 1 JEE 2019 1

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Let  $\alpha$  and  $\beta$  ( $\alpha > \beta$ ) be the roots of the equation  $z^2 - z - 1 = 0$ . Define,

$$a_n = \frac{\alpha^n - \beta^n}{\alpha - \beta}, \quad n \geq 1 \quad (1.1)$$

$$b_n = a_{n-1} - a_{n+1}, \quad n \geq 2, \quad b_1 = 1 \quad (1.2)$$

Verify the following using a python code.

1.1

$$\sum_{k=1}^n a_k = a_{n+2} - 1, \quad n \geq 1 \quad (1.3)$$

1.2

$$\sum_{k=1}^{\infty} \frac{a_k}{10^k} = \frac{10}{89} \quad (1.4)$$

1.3

$$b_n = \alpha^n + \beta^n, \quad n \geq 1 \quad (1.5)$$

1.4

$$\sum_{k=1}^{\infty} \frac{b_k}{10^k} = \frac{8}{89} \quad (1.6)$$

#### **Solution:**

Download the Python code using

```
wget https://https://github.com/HARI-donk-EY/sig_pros/tree/main/pingala/codes/1.py
```

and run it using,

```
python3 1.py
```