1

Sample B Higher Calc Paper 3

19 Prove algebraically that the recurring decimal $0.3\dot{1}\dot{8}$ can be written as $\dfrac{7}{22}$

$$\text{let} \quad x = 0.3\dot{1}\dot{8}$$

$$\times 10 \quad 10x = 3.\dot{1}\dot{8} \quad \cdots \text{(i)} \quad \textcircled{1}$$

$$\times 100 \quad 1000x = 318.\dot{1}\dot{8} \quad \cdots \text{(ii)}$$

equation (ii) − equation (i)

$$990x = 315$$

$$x = \frac{315}{990} = \frac{7}{22} \quad \textcircled{1}$$

(Total for Question 19 is 2 marks)

2

21 $x = 0.0\overset{.}{4}\overset{.}{5}$

Prove algebraically that x can be written as $\dfrac{1}{22}$

$x = 0.045454545\ldots$ ①

$10x = 0.454545\ldots$ $\ldots\ldots$ ⓘ

$1000x = 45.454545\ldots\ldots$ $\ldots\ldots$ ⓘⓘ

equ ⓘⓘ − equ ⓘ

$990x = 45$ ①

$x = \dfrac{45}{990} = \dfrac{5}{110} = \dfrac{1}{22}$

①

(Total for Question 15 is 2 marks)