Cambridge International AS & A Level

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Mathematics 9709/12

Paper 1 Pure Mathematics 1 **May/June 2022**

Question No (2)

2 The second and third terms of a geometric progression are 10 and 8 respectively.

Find the sum to infinity.

Solution:

Geometric progression is

$a, ar, ar^2, ar^3 \ldots\ldots$

As given, second term is

$$ar = 10 \rightarrow (1)$$

And third term

$$ar^2 = 8 \rightarrow (2)$$

Dividing (2) by (1)

$$\frac{ar^2}{ar} = \frac{8}{10} \Rightarrow r = \frac{4}{5} < 1$$

$$put\ r = \frac{4}{5}\ \ in\ (1)$$

$$ar = 10 \Rightarrow a\left(\frac{4}{5}\right) = 10$$

$$a = \frac{50}{4} = \frac{25}{2}$$

Sum to infinity

$$S_\infty = \frac{a}{1 - r} \quad \because\ r = \frac{4}{5} < 1$$

$$= \frac{\frac{25}{2}}{1 - \frac{4}{5}} = \frac{\frac{25}{2}}{\frac{1}{5}} = \frac{25}{2} \times \frac{5}{1}$$

$$S_\infty = \frac{125}{2}$$

$$\boldsymbol{s_\infty = 62\frac{1}{2}}$$