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Mathematics

9709/12

Paper 1 Pure Mathematics 1

May/June 2022

Question No (2)

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- 2 The second and third terms of a geometric progression are 10 and 8 respectively.  
Find the sum to infinity.

Solution:

Geometric progression is

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

As given, second term is

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

And third term

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

Dividing (2) by (1)

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

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

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

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

**Sum to infinity**

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

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

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

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

