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Geometric Series

| Past Paper Question | C2 Edexcel June 2012

Q9(b)(c)(d)

The third and fifth terms of a geometric series are 5.4 and 1.944 respectively and all the terms in the series are positive.

For this series find,

(b) the common ratio, (2)

(c) the first term, (2)

(d) the sum to infinity. (3)

b) $a, ar, ar^2, ar^3, ar^4, \dots$

$-, -, 5.4, -, 1.944$

$$\therefore ar^4 = 1.944 \quad \textcircled{1}$$

$$ar^2 = 5.4 \quad \textcircled{2}$$

$$\frac{\textcircled{1}}{\textcircled{2}}: \frac{ar^4}{ar^2} = \frac{1.944}{5.4}$$

$$\therefore r^2 = 0.36$$

$$\therefore r = \pm\sqrt{0.36}$$

$$\therefore r = 0.6 \text{ or } -0.6$$

$$\therefore r = 0.6 \text{ since } r > 0$$

c) Sub $r = 0.6$ into $\textcircled{2}$

$$\therefore a(0.6)^2 = 5.4$$

$$\therefore a = \frac{5.4}{0.6^2}$$

$$\therefore a = 15$$

$$d) S_{\infty} = \frac{a}{1-r}$$

$$= \frac{15}{1-0.6}$$

$$= 37.5$$

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