

1. The first term in an infinite geometric series is 6. The sum of the infinite geometric series is 30.

(a) Find the common ratio (2 marks)

(b) Find the sum of the first ten terms of the sequence (2 marks)

(c) Find the value of  $n$  for which  $S_n > 28$  (3 marks)

Mark scheme:

$$(a) 30 = \frac{6}{1-r} \quad (M1)$$

$$30 - 30r = 6$$

$$-30r = -24$$

$$r = 0.8 \quad (A1)$$

$$(b) S_{10} = \frac{6(1-0.8^{10})}{1-0.8} \quad (M1)$$

$$S_{10} = 26.779 \quad (A1)$$

$$(c) \frac{6(1-0.8^n)}{1-0.8} > 28 \quad (M1)$$

$$n > 12.1 \quad (A1)$$

$$n = 13 \quad (A1)$$