

Exercise 14B

- 1 Find the sum to infinity of the following geometric series. Give your answers to parts (a) to (j) as whole numbers, fractions or exact decimals.
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| (a) $1 + \frac{1}{2} + \frac{1}{4} + \dots$ | (b) $1 + \frac{1}{3} + \frac{1}{9} + \dots$ |
| (c) $\frac{1}{3} + \frac{1}{25} + \frac{1}{125} + \dots$ | (d) $0.1 + 0.01 + 0.001 + \dots$ |
| (e) $1 - \frac{1}{3} + \frac{1}{9} - \dots$ | (f) $0.2 - 0.04 + 0.008 - \dots$ |
| (g) $\frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \dots$ | (h) $\frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \dots$ |
| (i) $10 - 5 + 2.5 - \dots$ | (j) $50 + 10 + 2 + \dots$ |
| (k) $x + x^2 + x^3 + \dots$, where $-1 < x < 1$ | (l) $1 - x^2 + x^4 - \dots$, where $x^2 < 1$ |
| (m) $1 + x^{-1} + x^{-2} + \dots$, where $ x > 1$ | (n) $x^2 - x + 1 - \dots$, where $ x > 1$ |
- 2 Express each of the following recurring decimals as exact fractions.
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| (a) 0.363 636... | (b) 0.123 123 123... |
| (c) 0.555... | (d) 0.471 471 471... |
| (e) 0.142 857 142 857 142 857... | (f) 0.285 714 285 714 285 714... |
| (g) 0.714 285 714 285 714 285... | (h) 0.857 142 857 142 857 142... |
- 3 Find the common ratio of a geometric series which has a first term of 5 and a sum to infinity of 6.
- 4 Find the common ratio of a geometric series which has a first term of 11 and a sum to infinity of 6.
- 5 Find the first term of a geometric series which has a common ratio of $\frac{3}{4}$ and a sum to infinity of 12.

