Applications of geometric series (1)

QUESTION **1** Tom decides to exercise on a regular basis. He intends to exercise 5 minutes per day for the first week, 10 minutes per day for the second week and in each subsequent week to double the number of minutes. Kate makes a bet with Tom that he will give up the plan in 8 weeks or less. Who do you think will win the bet? Justify your answer.

QUESTION **2** A tree is 1 metre high when it is planted. It grows 3 metres in the first year and 1 metre in the second year. If each year its growth is $\frac{1}{3}$ of that of the previous year, how tall will the tree grow?

Series and applications

Applications of geometric series (2)

QUESTION **1** In her will a woman leaves an allocated amount to a charity to be paid over several years. The charity will receive $10 000 in the first year, $8000 in the second year and so on, each year receiving 80% of what it did in the previous year.

a How much, to the nearest whole dollar, will the charity receive in the 12^{th} year?

b What is the total amount the charity will receive?

c The woman changes the terms of the will so that when the donation falls below $200 per year the remaining amount allocated will be paid in full.

i When will the donation fall below $200?

ii How much will be donated in the final payment?

Page 157 1 Kate. Tom would need to exercise for 10 hours and 40 minutes per day in the 8^{th} week. 2 5.5 m
Page 158 1 **a** $859 **b** $50 000 **c i** 19^{th} year **ii** $901