# 1.3 Geometric Sequence and series\_P\_2

**1a.** *[3 marks]*

John purchases a new bicycle for 880 US dollars (USD) and pays for it with a Canadian credit card. There is a transaction fee of 4.2 % charged to John by the credit card company to convert this purchase into Canadian dollars (CAD).

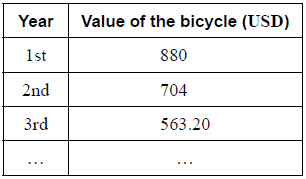
The exchange rate is 1 USD = 1.25 CAD.

Calculate, in CAD, the total amount John pays for the bicycle.



**1b.** *[3 marks]*

John insures his bicycle with a US company. The insurance company produces the following table for the bicycle’s value during each year.



The values of the bicycle form a geometric sequence.

Find the value of the bicycle during the 5th year. **Give your answer to two decimal places**.



**1c.** *[2 marks]*

Calculate, in years, when the bicycle value will be less than 50 USD.



**2a.** *[3 marks]*

A new café opened and during the first week their profit was $60.

The café’s profit increases by $10 every week.

Find the café’s profit during the 11th week.



**2b.** *[3 marks]*

Calculate the café’s **total** profit for the first 12 weeks.



**2c.** *[3 marks]*

A new tea-shop opened at the same time as the café. During the first week their profit was also $60.

The tea-shop’s profit increases by 10 % every week.

Find the tea-shop’s profit during the 11th week.



**2d.** *[3 marks]*

Calculate the tea-shop’s **total** profit for the first 12 weeks.



**2e.** *[4 marks]*

In the *m*th week the tea-shop’s **total** profit exceeds the café’s **total** profit, for the first time since they both opened.

Find the value of *m*.



**3a.** *[3 marks]*

Antonio and Barbara start work at the same company on the same day. They each earn an annual salary of  euros during the first year of employment. The company gives them a salary increase following the completion of each year of employment. Antonio is paid using plan A and Barbara is paid using plan B.

Plan A: The annual salary increases by  euros each year.

Plan B: The annual salary increases by  each year.

Calculate

i)     Antonio’s annual salary during his second year of employment;

ii)    Barbara’s annual salary during her second year of employment.



**3b.** *[4 marks]*

Write down an expression for

i)     Antonio’s annual salary during his  th year of employment;

ii)    Barbara’s annual salary during her  th year of employment.



**3c.** *[2 marks]*

Determine the number of years for which Antonio’s annual salary is greater than or equal to Barbara’s annual salary.



**3d.** *[7 marks]*

Both Antonio and Barbara plan to work at the company for a total of  years.

i)     Calculate the **total amount** that **Barbara** will be paid during these  years.

ii)    Determine whether Antonio earns more than Barbara during these  years.



**4a.** *[2 marks]*

Prachi visits a tourist centre nearby. It opened at the start of  and in the first year there were  visitors. The number of people who visit the tourist centre is expected to increase by  each year.

Calculate the number of people expected to visit the tourist centre in .



**4b.** *[3 marks]*

Calculate the total number of people expected to visit the tourist centre during the first  years since it opened.



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