# 1.3 Geometric Sequence and series\_P\_2

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

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

1.042 × 880 × 1.25  **OR**  (880 + 0.042 × 880) × 1.25     ***(M1)(M1)***

**Note:** Award ***(M1)*** for multiplying 880 by 1.042 and ***(M1)*** for multiplying 880 by 1.25.

1150 (CAD)  (1146.20 (CAD))     ***(A1)(G2)***

**Note:** Accept 1146.2 (CAD)

***[3 marks]***

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

## Markscheme

  **OR**      ***(M1)***

**Note:** Award ***(M1)*** for correctly dividing sequential terms to find the common ratio, or 0.8 seen.

880(0.8)    ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into geometric sequence formula.

360.45 (USD)     ***(A1)(G3)***

**Note:** Do not award the final ***(A1)*** if the answer is not correct to 2 decimal places. Award at most ***(M0)(M1)(A0)*** if .

***[3 marks]***

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

## Markscheme

   ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into geometric sequence formula and (in)equating to 50. Accept weak or strict inequalities. Accept an equation. Follow through from their common ratio in part (b). Accept a sketch of their GP with  as a valid method.

**OR**

  **AND**      ***(M1)***

**Note:** Award ***(M1)*** for their  and  **both** seen. If the student states , without  seen, this is not sufficient to award ***(M1)***.

14 or “14th year” or “after the 13th year”    ***(A1)*(ft)*(G2)***

**Note:** The context of the question requires the final answer to be an integer. Award at most ***(M1)(A0)*** for a final answer of 13.9 years. Follow through from their 0.8 in part (b).

***[2 marks]***

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

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

60 + 10 × 10     ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution into the arithmetic sequence formula, ***(A1)*** for correct substitution.

= ($) 160     ***(A1)(G3)***

***[3 marks]***

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

## Markscheme

     ***(M1)(A1)*(ft)**

**Note:** Award ***(M1)*** for substituting the arithmetic series formula, ***(A1)*(ft)** for correct substitution. Follow through from their first term and common difference in part (a).

= ($) 1380     ***(A1)*(ft)*(G2)***

***[3 marks]***

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

## Markscheme

60 × 1.1     ***(M1)(A1)***

**Note:** Award ***(M1)*** for substituting the geometric progression *n*th term formula, ***(A1)*** for correct substitution.

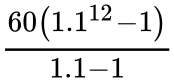
= ($) 156  (155.624…)     ***(A1)(G3)***

**Note:** Accept the answer if it rounds correctly to 3 sf, as per the accuracy instructions.

***[3 marks]***

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

## Markscheme

     ***(M1)(A1)*(ft)**

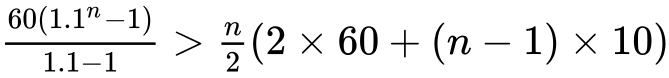
**Note:** Award ***(M1)*** for substituting the geometric series formula, ***(A1)*(ft)** for correct substitution. Follow through from part (c) for their first term and common ratio.

= ($)1280  (1283.05…)     ***(A1)*(ft)*(G2)***

***[3 marks]***

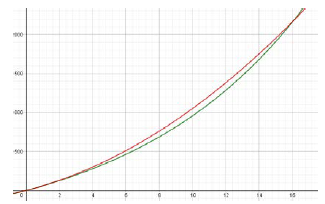
**2e.** *[4 marks]*

## Markscheme

    ***(M1)(M1)***

**Note:** Award ***(M1)*** for correctly substituted geometric and arithmetic series formula with *n* (accept other variable for “*n*”), ***(M1)*** for comparing their expressions consistent with their part (b) and part (d).

**OR**

     ***(M1)(M1)***

**Note:** Award ***(M1)*** for two curves with approximately correct shape drawn in the first quadrant, ***(M1)*** for one point of intersection with approximate correct position.

Accept alternative correct sketches, such as



Award ***(M1)*** for a curve with approximate correct shape drawn in the 1 (or 4) quadrant and all above (or below) the *x*-axis, ***(M1)*** for one point of intersection with the x-axis with approximate correct position.

17      ***(A2)*(ft)*(G3)***

**Note:** Follow through from parts (b) and (d).  
An answer of 16 is incorrect. Award at most ***(M1)(M1)(A0)(A0)*** with working seen. Award ***(G0)*** if final answer is 16 without working seen.

***[4 marks]***

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

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

i)            ***(A1)***

ii)           ***(M1)***

**Note:** Award ***(M1)*** for   **OR** 

       ***(A1)(G3)***

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

## Markscheme

i)             ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution in arithmetic sequence formula; ***(A1)*** for correct substitutions.

ii)            ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution in arithmetic sequence formula; ***(A1)*** for correct substitutions.

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

## Markscheme

        ***(M1)***

**Note:** Award ***(M1)*** for setting a correct inequality using their expressions for (b)(i) and (b)(ii). Accept an equation.

**OR**

list of at least 4 correct terms of each sequence        ***(M1)***

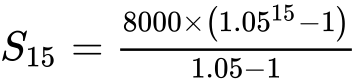
**Note:** Award ***(M1)*** for correct lists corresponding to their answers for parts (b)(i) and (b)(ii).

        ***(A1)*(ft)*(G2)***

**Note:** Value must be an integer for the final ***(A1)*** to be awarded. Follow through from parts (b)(i) and (b)(ii). Award ***(G1)*** for a final answer of  seen without working.

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

## Markscheme

i)              ***(M1)(A1)*(ft)**

**Note:** Award ***(M1)*** for substitution into geometric series formula and ***(A1)*** for correct substitution of  and their  from part (b)(ii). Follow through from part (b)(ii).

**OR**

        ***(M1)(A1)*(ft)**

**Note:** Follow through from part (b)(ii).

         ***(A1)*(ft)*(G2)***

ii)             ***(M1)(A1)*(ft)**

**Note:** Award ***(M1)*** for substitution into arithmetic series formula and ***(A1***) for correct substitution, using their first term and their last term from part (b)(i), or their  and . Follow through from part (b)(i).

**OR**

          ***(M1)(A1)*(ft)**

**Note:** Follow through from part (b)(i).

         ***(A1)*(ft)*(G2)***

Antonio does not earn more than Barbara

(his total salary will be less than Barbara’s)         ***(A1)*(ft)**

**Note:** Award ***(A1)*(ft)** for a final answer that is consistent with their part (d)(i) and (d)(ii). Accept “Barbara earns more”. The final ***(A1)*** can only be awarded if two total salaries are seen.

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

## Markscheme

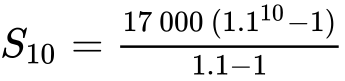
 (or equivalent)          ***(M1)***

**Note:** Award ***(M1)*** for multiplying  by  or equivalent.

                   ***(A1)(G2)***

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

## Markscheme

           ***(M1)(A1)*(ft)**

**Note:** Award ***(M1)*** for substitution into the geometric series formula, ***(A1)*(ft)** for correct substitution. Award ***(A1)*(ft)** for a list of their correct  terms, ***(M1)*** for adding their  terms.

           ***(A1)*(ft)(G2)**

**Note:** Follow through from their  in part (e).

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