

MATHEMATICS SPECIALISED Level 4

Common Assessment Task

Work Requirements:

N/A

Assessment Type:

Short response

Criteria being assessed:

- Criterion 1 - elements 1 and 2
- Criterion 4 – element 6

Suggested conditions:

- should take learners 60 minutes
- learners should submit an individual written response.

Task Description:

You will create a worked solution to a problem. You will then mark another learner's solution against criterion 1 (elements 1 and 2).

As background, you will participate in a discussion about what a mortgage is, clarifying the idea of paying down a loan with regular payments and the calculation of interest as a cost.

What you need to do:

1. Provide a worked solution to the problem:

Find the sum of $1 + (2 \times 3) + 3 + (4 \times 5) + 5 + (6 \times 7) + \dots$ to $2n + 1$ terms.

Express your solution as a fully simplified and factorised fraction.

2. Mark a learner's solution to the same problem.

Write your comments on the learner's response to highlight evidence against criterion 1- elements 1 and 2 and to standard A, B or C.

Criterion I: communicate mathematical ideas and information

The learner:

Rating A	Rating B	Rating C
presents work that conveys a logical line of reasoning that has been followed between question and answer	presents work that conveys a line of reasoning that has been followed between question and answer	presents work that shows some of the mathematical processes that have been followed between question and answer
consistently uses mathematical conventions and symbols correctly	generally uses mathematical conventions and symbols correctly	uses mathematical conventions and symbols (There may be some errors or omissions in doing so.)

Learner response to the problem for you to mark.

(3)

Q 4 $1 + (2 \times 3) + 3 + (4 \times 5) + 5 + (6 \times 7) + 7 + (8 \times 9)$ to $2n+1$ Terms.

Splitting gives us
 $1+3+5+7$ to $n+1$ terms $+ (2 \times 3) + (4 \times 5) + (6 \times 7)$

Pattern $2r - 1$ Pattern $2r(2r+1)$

$$\sum_{r=1}^{n+1} 2r - 1$$

$$\sum 4r^2 + 2r$$

$$2\sum r - \sum 1$$

$$4\sum r^2 + 2\sum r$$

$$\frac{2(n+1)(n+2)}{2} - \frac{n+1}{2}$$

$$\frac{4n(n+1)(n+2)}{6} + \frac{2n(n+1)}{2}$$

$$\frac{(n+1)(3n+1)}{2}$$

$$\frac{4n(n+1)(n+2)}{6} + \frac{6n(n+1)}{6}$$

$$\frac{3(n+1)(n+1)}{6}$$

$$\frac{2n(n+1)(4n+5)}{6}$$

$$\frac{(n+1) [3(n+1) + 2n(4n+5)]}{6}$$

$$= \frac{(n+1) [3n+3 + 8n^2 + 10n]}{6}$$

$$= \frac{(n+1) (8n^2 + 13n + 3)}{6}$$

3. Produce your own sequence (make it as complex as you can) and then find the sum of this sequence.
4. Is the payment cycle for a fixed interest mortgage a sequence? Why / Why not? If you think yes, is it possible to find the sum of the series?

Teacher use only - What needs to be submitted for assessment?

Learners respond to the questions in a separate document, clearly identifying each question.