1. The first four terms of an arithmetic sequence are shown below.

$$1, 5, 9, 13, ...$$

(a) Write down the nth term of the sequence.

(b) Calculate the 100th term of the sequence.

(c) Find the sum of the first 100 terms of the sequence.

Working:

Answers:

(a) ....

(b) ....

(c) ....

(Total 4 marks)

2. The fourth term of an arithmetic sequence is 12 and the tenth term is 42.

(a) Given that the first term is u_1 and the common difference is d, write down two equations in u_1 and d that satisfy this information.

(b)   Solve the equations to find the values of u_1 and d.

Working:

Answers:

(a)   ....

    ....

(b) $u_1 =$ ....

    $d =$ ....

(Total 8 marks)

3.   The sixth term of an arithmetic sequence is 24. The common difference is 8.

(a)   Calculate the first term of the sequence.

The sum of the first *n* terms is 600.

(b)   Calculate the value of *n*.

Working:

Answers:

(a)   ....

(b)   ....

(Total 8 marks)

4.   The first five terms of an arithmetic sequence are shown below.

2,   6,   10,   14,   18

(a)   Write down the sixth number in the sequence.

(b)   Calculate the 200th term.

(c)   Calculate the sum of the first 90 terms of the sequence.

Working:

Answers:

(a) ....

(b) ....

(c) ....

(Total 8 marks)

1.   (a) $4n - 3$ (A1)

(b)   397   (A1)

(c) $S_{100} = \dfrac{100}{2}[(2 \times 1) + (99 \times 4)]$ or $50(1 + 397)$ (M1)

    = 19 900   (A1)

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2.   (a) $u_1 + 3d = 12$ (A1)(A1)

    $u_1 + 9d = 42$ (A1)(A1) (C4)

> ***Note:*** *Award (A1) for left hand side correct, (A1) for right hand side correct.*

(b) $6d = 30$ (A1)

    $d = 5$ (A1)

    $u_1 = -3$ (M1)(A1)

> ***Note:*** *Follow through (ft) from candidate's equations.*

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3.   (a) $u_6 = u_1 + 5d = 24$

    $u_1 + 5 \times 8 = 24$ (M1)(A1)

    $u_1 = 24 - 40$

    $= -16$ (A1) (C3)

(b) $S_n = \dfrac{n}{2}(2 \times -16 + (n-1)8)$ (M1)(A1)

    $600 = \dfrac{n}{2}(-32 + 8n - 8)$ (A1)

    $1200 = -40n + 8n^2$

    $150 = -5n + n^2$ (A1)

    $(n - 15)(n + 10) = 0$

    $n = 15$ or $\cancel{-10}$ (A1)   (C5)

> ***Note:*** *Not all the steps of working out need to be shown.*

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4.   (a)   The sixth number is 22   (C1)

(b) $u_{200} = 2 + 199 \times 4$ (M1)(A1)(A1)

    $= 798$ (A1)   (C4)

> ***Note:*** *Award (A1) for a = 2 stated or used, (A1) for d = 4 stated or used.*

(c)　　$S_{90} = \dfrac{90}{2}(2 \times 2 + 89 \times 4)$ or $\dfrac{90}{2}(2 + 358)$　　　　　　　　　　(M1)(A1)

　　　　　$= 16\ 200$　　　　　　　　　　　　　　　　　　　　　　　　　　　(A1)　　(C3)

[8]