Arithmetic sequences

Student name: _____ Score: _____

1. In an arithmetic sequence, the fifth term, u_5, is greater than the first term, u_1. The difference between these terms is 36.

(a) Find the common difference, d. *[2 marks]*

The tenth term of the sequence is double the seventh term.

(b) (i) Write down an equation in u_1 and d to show this information.

(ii) Find u_1. *[4 marks]*

2. The second term of an arithmetic sequence is 30. The fifth term is 90.

(a) Calculate

(i) the common difference of the sequence;

(ii) the first term of the sequence. [3]

3. The seventh term, u_7, of an arithmetic sequence is 28. The tenth term, u_{10}, of the same sequence is 37.

(a) Find d, the common difference of the sequence. [2]

(b) Find u_1, the first term of the sequence. [2]

4. The first term, u_1, of an arithmetic sequence is 145. The fifth term, u_5, of the sequence is 113.

(a) Find the common difference of the sequence. *[2]*

The n^{th} term, u_n, of the sequence is -7.

(b) Find the value of n. *[2]*

5. The first three terms of an arithmetic sequence are 5, 6.7, 8.4.

(a) Find the common difference. *[2 marks]*

(b) Find the 28^{th} term of the sequence. *[2 marks]*

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6. The first term of an arithmetic sequence is 3 and the seventh term is 33.

Calculate

(a) the common difference; *[2 marks]*

(b) the 95th term of the sequence; *[2 marks]*

7. The n^{th} term of an arithmetic sequence is given by $u_n = 5 + 2n$.

(a) Write down the common difference.

(b) Given that the n^{th} term of this sequence is 115, find the value of n.

8. The first three terms of an arithmetic sequence are $u_1 = 0.3$, $u_2 = 1.5$, $u_3 = 2.7$.

(a) Find the common difference. [2]

(b) Find the 30th term of the sequence. [2]

9. In an arithmetic sequence $u_{10} = 8$, $u_{11} = 6.5$.

(a) Write down the value of the common difference. [1]

(b) Find the first term. [3]

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

1, 5, 9, 13, ...

(a) Write down the n^{th} term of the sequence.

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

11. 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.

12. The first term of an arithmetic sequence is –16 and the eleventh term is 39.
Calculate the value of the common difference.

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13. The first term of an arithmetic sequence is 3 and the sum of the first two terms is 11.

(a) Write down the second term of this sequence. *[1 mark]*

(b) Write down the common difference of this sequence. *[1 mark]*

(c) Write down the fourth term of this sequence. *[1 mark]*

(d) The n^{th} term is the first term in this sequence which is greater than 1000. Find the value of n. *[3 marks]*

14. Consider the arithmetic sequence

$$326,\ 321,\ 316,\ 311,\ \ldots,\ 191.$$

(a) Find the value of the common difference of this sequence. *[2 marks]*

(b) Find the number of terms in this sequence. *[2 marks]*

Arithmetic sequences

Student name: ANSWERS Score: _____

1. In an arithmetic sequence, the fifth term, u_5, is greater than the first term, u_1. The difference between these terms is 36.

(a) Find the common difference, d. d = 9 *[2 marks]*

The tenth term of the sequence is double the seventh term.

(b) (i) Write down an equation in u_1 and d to show this information. $u_1 + 9d = 2u_1 + 12d$

(ii) Find u_1. $u_1 = -27$ *[4 marks]*

2. The second term of an arithmetic sequence is 30. The fifth term is 90.

(a) Calculate

d = 3

(i) the common difference of the sequence; d = 20

10

(ii) the first term of the sequence. 10 [3]

3. The seventh term, u_7, of an arithmetic sequence is 28. The tenth term, u_{10}, of the same sequence is 37.

(a) Find d, the common difference of the sequence. [2]

(b) Find u_1, the first term of the sequence. [2]

4. The first term, u_1, of an arithmetic sequence is 145. The fifth term, u_5, of the sequence is 113.

(a) Find the common difference of the sequence. d = –8 *[2]*

The n^{th} term, u_n, of the sequence is –7.

(b) Find the value of n. 20 *[2]*

5. The first three terms of an arithmetic sequence are 5, 6.7, 8.4.

(a) Find the common difference. d = 1.7 *[2 marks]*

(b) Find the 28^{th} term of the sequence. 50.9 *[2 marks]*

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6. The first term of an arithmetic sequence is 3 and the seventh term is 33.

Calculate

(a) the common difference; d = 5 *[2 marks]*

(b) the 95th term of the sequence; 473 *[2 marks]*

7. The n^{th} term of an arithmetic sequence is given by $u_n = 5 + 2n$.

(a) Write down the common difference. d = 2

(b) Given that the n^{th} term of this sequence is 115, find the value of n. $n = 55$

8. The first three terms of an arithmetic sequence are $u_1 = 0.3$, $u_2 = 1.5$, $u_3 = 2.7$.

(a) Find the common difference. d = 1.2 [2]

(b) Find the 30th term of the sequence. 35.1 [2]

9. In an arithmetic sequence $u_{10} = 8$, $u_{11} = 6.5$.

(a) Write down the value of the common difference. d = – 1.5 [1]

(b) Find the first term. 21.5 [3]

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

1, 5, 9, 13, ...

(a) Write down the n^{th} term of the sequence. $4n - 3$

(b) Calculate the 100th term of the sequence. 397

11. 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. $u_1 + 3d = 12$
$u_1 + 9d = 42$

(b) Solve the equations to find the values of u_1 and d.
$u_1 = -3$
$d = 5$

12. The first term of an arithmetic sequence is –16 and the eleventh term is 39.
Calculate the value of the common difference. d = 5.5

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13. The first term of an arithmetic sequence is 3 and the sum of the first two terms is 11.

(a) Write down the second term of this sequence. 8 *[1 mark]*

(b) Write down the common difference of this sequence. 5 *[1 mark]*

(c) Write down the fourth term of this sequence. 18 *[1 mark]*

(d) The n^{th} term is the first term in this sequence which is greater than 1000. Find the value of n. $n = 201$ *[3 marks]*

14. Consider the arithmetic sequence

$$326,\ 321,\ 316,\ 311,\ \ldots,\ 191.$$

(a) Find the value of the common difference of this sequence. -5 *[2 marks]*

(b) Find the number of terms in this sequence. 28 *[2 marks]*

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