Sequences - Worksheet

Skill

Group A - Arithmetic sequences

Find the first 3 terms in each sequence:

1) $n + 3$

2) $2n + 3$

3) $5n + 5$

4) $-n + 1$

5) $-5n + 10$

6) $\frac{1}{2}n$

7) $-6n - 3$

8) $-n - 2$

9) $-0.5n$

10) $0.1n - 0.1$

11) $0.25 - 0.75n$

12) $-1\frac{1}{2} - 2.9n$

Group B - Geometric sequences

Find the next 2 term in each geometric sequence:

1) $1, 4, 16, ..., ...$

2) $2, 40, 800, ..., ...$

3) $40, 20, 10, ..., ...$

4) $2, -8, 32, ..., ...$

5) $125, 25, 5, ..., ...$

6) $-2, 20, -200, ..., ...$

7) $50, 25, 12.5, ..., ...$

8) $100, 50, 25, ..., ...$

9) $\frac{1}{2}, 2\frac{1}{2}, 12\frac{1}{2}, ..., ...$

10) $1, -1, 1, ..., ...$

11) $0.2, -0.8, 3.2, ..., ...$

12) $-2.4, 4.8, -9.6, ..., ...$

Group C - Finding the nth term of a linear sequence

Determine the n^{th} term of each sequence:

1) $2, 4, 6,$

2) $3, 5, 7,$

3) $0, 3, 6,$

4) $-1, -3, -5,$

5) $-4, -6, -8,$

6) $10, 0, -10,$

7) $-5, -1, 3,$

8) $-3, -2, -1,$

9) $-58, -37, -16,$

10) $0.5, 1, 1.5,$

11) $100, 50, 0,$

12) $1, \frac{1}{2}, 0$

Sequences - Worksheet

Group D - Finding the nth term of a quadratic sequence

Determine the n^{th} term of each sequence:

1) $1, 4, 9,$

2) $0, 3, 8,$

3) $2, 8, 18,$

4) $3, 12, 27,$

5) $2, 11, 26,$

6) $-4, -1, 4,$

7) $5, 14, 29,$

8) $6, 22, 43,$

9) $4, 12, 24,$

10) $5, 13, 25,$

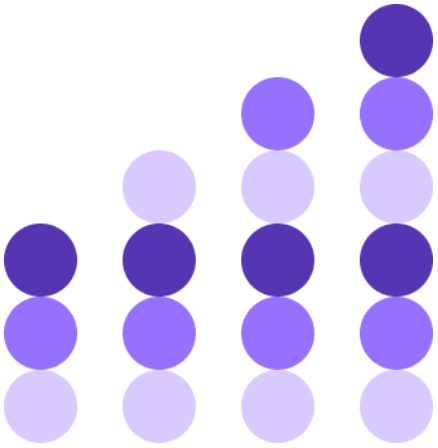
11) $1, 6, 17,$

12) $0, 12, 34,$

Sequences - Worksheet

Applied

1) Below is a diagram showing the first four terms of a number sequence.



a) How many circles would be in the next term?

b) What would be the n^{th} term for the number pattern?

c) How many dots are in the 25^{th} term?

2) John says the number 1025 is a term in the sequence $2n + 2$. Explain why he is wrong.

3) A number sequence has the n^{th} term $150 - 3n$.

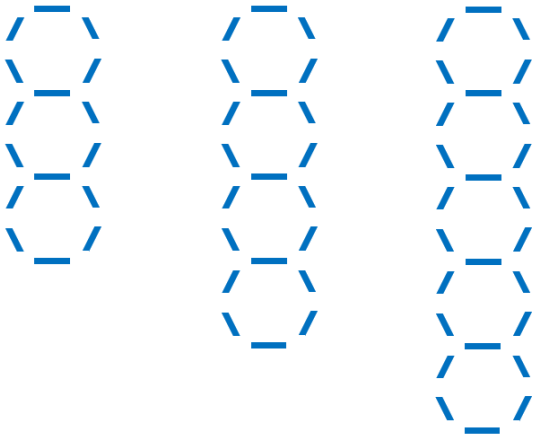
a) What would the 10^{th} term be?

b) Calculate the term number which will be the first negative number in the sequence.

4) Lucy has a charm necklace with 30 charms on it. Every month she adds two new charms onto the necklace. How many charms will there be on the necklace after 2 years?

Sequences - Worksheet

5) Below is a number sequence found by counting the edges of the pattern.



a) What is the value of term 4?

b) Write the n^{th} term for the sequence?

c) How many edges would be in term 16?

6) The *n*th term of a sequence is $2n - 1$.

a) Write down the first 4 terms of the sequence.

b) Which term of the sequence is equal to 23.

c) Explain why 100 is not a term in the sequence.

7) **a)** Write a rule for the number pattern below:

$1,\ 1,\ 2,\ 3,\ 5,\ 8,\ 13$

b) What is the special name given to this sequence?

Sequences - Worksheet

8) Match each named sequence to its n^{th} term.

odd numbers	n^3
square numbers	n^2
triangular numbers	$2n - 1$
even numbers	$\frac{n(n+1)}{2}$
cube numbers	$2n$

Sequences - Exam Questions

1) **(a)** What is the rule to get from one term to the next?

$5,\ 8,\ 11,\ 14$

.....

(1)

(b) Find the first and fifth term for the sequence below.

$-\ 5n\ +\ 2$

.....

(2)

(3 marks)

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2) **(a)** What is the 12^{th} term in the sequence $2n\ -\ 20$?

.....

(1)

(b) If the last term in the same sequence is 180, how many terms are in the sequence?

.....

(2)

(3 marks)

Sequences - Exam Questions

3) Look at this sequence:

$$1,\ 2,\ 4,\ 8,\ 16$$

(a) What is the common ratio in the above geometric sequence?

.....

(1)

(b) What would be the 7^{th} and 8^{th} term for the sequence?

.....

(2)

(c) A different geometric sequence is $2,\ a\ ,\ 288$.
Calculate the value of a.

.....

(3)

(6 marks)

Sequences - Answers

	Question	Answer
	Skill Questions	
Group A	Find the first 3 terms in each sequence: **1)** $n + 3$ **2)** $2n + 3$ **3)** $5n + 5$ **4)** $-n + 1$ **5)** $-5n + 10$ **6)** $\frac{1}{2}n$ **7)** $-6n - 3$ **8)** $-n - 2$ **9)** $-0.5n$ **10)** $0.1n - 0.1$ **11)** $0.25 - 0.75n$ **12)** $-\frac{1}{2} - 2.9n$	 **1)** $4, 5, 6$ **2)** $5, 7, 9$ **3)** $10, 15, 20$ **4)** $0, -1, -2$ **5)** $5, 0, -5$ **6)** $0.5, 1, 1.5$ **7)** $-9, -15, -21$ **8)** $-3, -4, -5$ **9)** $-0.5, -1, -1.5$ **10)** $0, 0.1, 0.2,$ **11)** $-0.5, -1.25, -2$ **12)** $-4.4, -7.3, -10.2$
Group B	Find the next 2 term in each geometric sequence: **1)** $1, 4, 16, ..., ...$ **2)** $2, 40, 800, ..., ...$ **3)** $40, 20, 10, ..., ...$ **4)** $2, -8, 32, ..., ...$ **5)** $125, 25, 5, ..., ...$ **6)** $-2, 20, -200, ..., ...$ **7)** $50, 25, 12.5, ..., ...$ **8)** $100, 50, 25, ..., ...$ **9)** $\frac{1}{2}, 2\frac{1}{2}, 12\frac{1}{2}, ..., ...$	 **1)** $64, 256$ **2)** $16\,000, 320\,000$ **3)** $5, 2.5$ **4)** $-128, 512$ **5)** $1, 0.2$ **6)** $2\,000, -20\,000$ **7)** $6\frac{1}{4}, 3\frac{1}{8}$ **8)** $12.5, 6.25$ **9)** $62\frac{1}{2}, 312\frac{1}{2}$

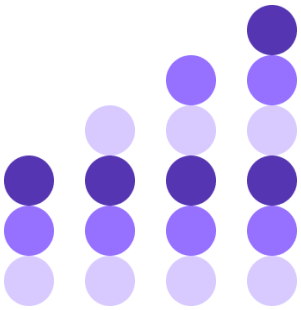
Sequences - Answers

Group B contd	**10)** $1, \ -1, \ 1, \ ..., \ ...$ **11)** $0.2, \ -0.8, \ 3.2, \ ..., \ ...$ **12)** $-2.4, \ 4.8, \ -9.6, \ ..., \ ...$	**10)** $-1, \ 1$ **11)** $-12.8, \ 51.2$ **12)** $19.2, \ -38.4$
Group C	Determine the n^{th} term of each sequence: **1)** $2, \ 4, \ 6,$ **2)** $3, \ 5, \ 7,$ **3)** $0, \ 3, \ 6,$ **4)** $-1, \ -3, \ -5,$ **5)** $-4, \ -6, \ -8,$ **6)** $10, \ 0, \ -10,$ **7)** $-5, \ -1, \ 3,$ **8)** $-3, \ -2, \ -1,$ **9)** $-58, \ -37, \ -16,$ **10)** $0.5, \ 1, \ 1.5,$ **11)** $100, \ 50, \ 0,$ **12)** $1, \ \frac{1}{2}, \ 0$	**1)** $2n$ **2)** $2n + 1$ **3)** $3n - 3$ **4)** $-2n + 1$ **5)** $-2n - 2$ **6)** $-10n + 20$ **7)** $4n - 9$ **8)** $n - 4$ **9)** $21n - 79$ **7)** $0.5n$ **8)** $-50n + 150$ **9)** $-\frac{1}{2}n + 1\frac{1}{2}$

Sequences - Answers

Group D	Determine the n^{th} term of each sequence:	
	1) $1,\ 4,\ 9,$	**1)** n^2
	2) $0,\ 3,\ 8,$	**2)** $n^2 - 1$
	3) $2,\ 8,\ 18,$	**3)** $2n^2$
	4) $3,\ 12,\ 27,$	**4)** $3n^2$
	5) $2,\ 11,\ 26,$	**5)** $3n^2 - 1$
	6) $-4,\ -1,\ 4,$	**6)** $n^2 - 5$
	7) $5,\ 14,\ 29,$	**7)** $3n^2 + 2$
	8) $6,\ 22,\ 43,$	**8)** $5n^2 + n$
	9) $4,\ 12,\ 24,$	**9)** $2n^2 + 2n$
	10) $5,\ 13,\ 25,$	**10)** $2n^2 + 2n + 1$
	11) $1,\ 6,\ 17,$	**11)** $3n^2 - 4n + 2$
	12) $0,\ 12,\ 34,$	**12)** $5n^2 - 3n - 2$

Sequences - Answers

	Question	Answer
	Applied Questions	
1)	Below is a diagram showing the first four terms of a number sequence.  **a)** How many circles would be in the next term? **b)** What would be the nth term for the number pattern? **c)** How many dots are in the 25^{th} term?	**a)** 7 **b)** $n + 2$ **c)** $25 + 2 = 27$
2)	John says the number 1025 is a term in the sequence $2n + 2$. Explain why he is wrong.	They are all even numbers.
3)	A number sequence has the n^{th} term $150 - 3n$. **a)** What would the $10th$ term be? **b)** Calculate the term number which will be the first negative number in the sequence.	**a)** 120 **b)** $150 - 3n = 0$ $n = 50$, therefore the 50th term is 0. 51^{st} term will be the first negative term
4)	Lucy has a charm necklace with 30 charms on it. Every month she adds two new charms onto the necklace. How many charms will there be on the necklace after 2 years?	78

Sequences - Answers

5)	Below is a number sequence found by counting the edges of the pattern. **a)** What is the value of term 4? **b)** Write the nth term for the sequence? **c)** How many edges would be in term 16?	 **a)** 26 **b)** $4n + 10$ **c)** $4 \times 16 + 10 = 74$
6)	The n^{th} term of a sequence is $2n - 1$. **a)** Write down the first 4 terms of the sequence. **b)** Which term of the sequence is equal to 23. **c)** Explain why 100 is not a term in the sequence.	 **a)** $1, 3, 5, 7$ **b)** Term 12 **c)** All the terms in the sequence are odd.
7)	**a)** Write a rule for the number pattern below: 1, 1, 2, 3, 5, 8, 13 **b)** What is the special name given to this sequence?	**a)** Add previous 2 terms to get next term **b)** Fibonacci sequence
8)	Match each named sequence to its n^{th} term. odd numbers — n^3 square numbers — n^2 triangular numbers — $2n - 1$ even numbers — $\frac{n(n+1)}{2}$ cube numbers — $2n$	odd numbers: $2n - 1$ square numbers: n^2 even numbers: $2n$ cube numbers: n^3 triangular numbers: $\frac{n(n+1)}{2}$

Sequences - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	What is the rule to get from one term to the next? 5, 8, 11, 14	**(a)** $+ 3$	**(1)**
(b)	Find the first and fifth term for the sequence below. $-5n + 2$	**(b)** -3 -23	**(1)** **(1)**
2) (a)	What is the $12th$ term in the sequence $2n - 20$?	**(a)** $2 \times 12 - 20 = 4$	**(1)**
(b)	If the last term in the same sequence is 180, how many terms are in the sequence?	**(b)** $2n - 20 = 180$ $2n = 200$ $n = 100$	**(1)** **(1)**
3)	Look at this sequence: 1, 2, 4, 8, 16		
(a)	What is the common ratio in the above geometric sequence?	**(a)** 2	**(1)**
(b)	What would be the 7^{th} and 8^{th} term for the sequence?	**(b)** $6th$ term $= 16 \times 2 = 32$ $7th$ term $= 32 \times 2 = 64$ $8th$ term $= 64 \times 2 = 128$	 **(1)** **(1)**
(c)	A different geometric sequence is $2, a, 288$. Calculate the value of a.	**(c)** $\frac{288}{a} = \frac{a}{2}$ $576 = a^2$ $24 = a$	**(1)** **(1)** **(1)**