

Sequences Starters

Retrieve and Connect

Q1. Matchstick Pattern



- (a) Draw the 4th shape.
- (b) How many matchsticks does it use?

Q2. Complete the Sequence

5, 10, 15, 20, __, __, __

Q3. Write the first 5 terms of the sequence with position-to-term rule: $2n$

__, __, __, __, __

Q4. Sam writes the 3 times table: 3, 6, 9, 12, 15...

He then **adds 2** to every term. Write the first 5 terms of Sam's sequence.
What is the n th term rule?

Q5. Extending Q1

Using the matchstick pattern from Q1:

- (a) How many matchsticks in the **10th** shape?
- (b) Write a rule for the n th shape.

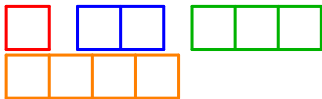
Q6. Challenge

Is **100** a term in the sequence with n th term $3n + 1$?

Show how you know.

Retrieve and Connect

Q1. Matchstick Pattern



- (a) Draw the 4th shape.
(b) How many matchsticks does it use?
(b) 13 matchsticks

Q2. Complete the Sequence

5, 10, 15, 20, 25, 30, 35
(add 5 each time)

Q3. Write the first 5 terms of the sequence with position-to-term rule: $2n$

2, 4, 6, 8, 10

Q4. Sam writes the 3 times table: 3, 6, 9, 12, 15...

He then **adds 2** to every term. Write the first 5 terms of Sam's sequence.
What is the n th term rule?

Terms: 5, 8, 11, 14, 17. n th term: $3n + 2$

Q5. Extending Q1

Using the matchstick pattern from Q1:

- (a) How many matchsticks in the 10th shape?
(b) Write a rule for the n th shape.
(a) 31 matchsticks.
(b) position-to-term rule: $3n + 1$

Q6. Challenge

Is 100 a term in the sequence with n th term $3n + 1$?

Show how you know.

Yes, when $n = 33$,
 $3n + 1 = 3 \times 33 + 1 = 99 + 1 = 100$

Retrieve and Connect

Q1. Dot Pattern



- (a) Draw the 4th picture.
(b) How many dots does it contain?

Q2. Complete the Sequence

4, 8, 12, 16, __, __, __

Q3. Write the first 5 terms of $3n + 1$

—, —, —, —, —

Q4. Alex writes the 5 times table: 5, 10, 15, 20, 25... He then **subtracts 1** from every term. Write the first 5 terms of Alex's sequence. What is the n th term rule?

Q5. Extend Q1

Using your dot pattern from Q1:

- (a) How many dots in the **10th** picture?
(b) Write a rule for the n th picture.

Q6. Challenge

Sequence A has n th term $4n - 2$.

Sequence B has n th term $2n + 6$.

Do they share a term
at the same position?

Retrieve and Connect

Q1. Dot Pattern



- (a) Draw the 4th picture.
(b) How many dots does it contain?

(b) 16 dots

Q2. Complete the Sequence

4, 8, 12, 16, 20, 24, 28
(add 4 each time)

Q3. Write the first 5 terms of $3n + 1$

4, 7, 10, 13, 16

Q4. Alex writes the 5 times table: 5, 10, 15, 20, 25... He then **subtracts 1** from every term. Write the first 5 terms of Alex's sequence. What is the n th term rule?

Terms: 4, 9, 14, 19, 24. n th term: $5n - 1$

Q5. Extend Q1

Using your dot pattern from Q1:

- (a) How many dots in the **10th** picture?
(b) Write a rule for the n th picture.

(a) 40 dots. (b) Rule: $4n$

Q6. Challenge

Sequence A has n th term $4n - 2$.

Sequence B has n th term $2n + 6$.

Do they share a term
at the same position?

$4n - 2 = 2n + 6 \Rightarrow n = 4$. Both
equal **14** at position $n = 4$.

Retrieve and Connect

Q1. Matchstick Triangles



- (a) Draw the 4th shape.
(b) How many matchsticks does it use?

Q2. Complete the Sequence

7, 14, 21, 28, __, __, __

Q3. Write the first 5 terms of $5n - 2$

__, __, __, __, __

Q4. A sequence **starts at 5** and **increases by 3** each time. Write the first 5 terms. What is the n th term rule?

Q5. Extending Q1

Using your triangle pattern from Q1:

- (a) Write a rule for the n th shape.
(b) How many matchsticks in the **20th** shape?

Q6. Challenge

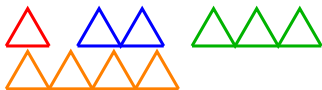
The n th term of a sequence is $4n + 3$.

Which term is the **first to exceed 75**?

Show your working clearly.

Retrieve and Connect

Q1. Matchstick Triangles



- (a) Draw the 4th shape.
(b) How many matchsticks does it use?
(b) 12 matchsticks

Q2. Complete the Sequence

7, 14, 21, 28, 35, 42, 49
(add 7 each time — the $7\times$ table)

Q3. Write the first 5 terms of $5n - 2$

3, 8, 13, 18, 23

Q4. A sequence **starts at 5** and **increases by 3** each time. Write the first 5 terms. What is the n th term rule?

Terms: 5, 8, 11, 14, 17. n th term: $3n + 2$

Q5. Extending Q1

Using your triangle pattern from Q1:

- (a) Write a rule for the n th shape.
(b) How many matchsticks in the 20th shape?
(a) Rule: $3n$. (b) 60 matchsticks.

Q6. Challenge

The n th term of a sequence is $4n + 3$.

Which term is the **first to exceed 75**?

Show your working clearly.

$4n + 3 > 75 \Rightarrow n > 18$. 19th term: $4(19) + 3 = 79$.

Retrieve and Connect

Q1. Dots



- (a) Draw the 4th pattern.
(b) How many dots does it contain?

Q2. Complete the Sequence

1, 5, 9, 13, __, __, __

Q3. Write the first 5 terms of $10 - 2n$

—, —, —, —, —

Q4. Mia writes the 6 times table: 6, 12, 18, 24, 30... She then **subtracts 4** from every term. Write the first 5 terms, find the n th term, and find the 50th term.

Q5. Find the n th Term

1, 5, 9, 13, 17, ...

What is the n th term rule?

Q6. Challenge

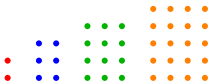
The n th term of a sequence is $10 - 2n$.

Which is the **last positive term**?

What is the **first negative term**?

Retrieve and Connect

Q1. Dots



- (a) Draw the 4th pattern.
(b) How many dots does it contain?

(b) 20 dots

Q2. Complete the Sequence

1, 5, 9, 13, 17, 21, 25
(add 4 each time)

Q3. Write the first 5 terms of $10 - 2n$

8, 6, 4, 2, 0

Q4. Mia writes the 6 times table: 6, 12, 18, 24, 30... She then **subtracts 4** from every term. Write the first 5 terms, find the n th term, and find the 50th term.

Terms: 2, 8, 14, 20, 26. n th term: $6n - 4$. 50th term: **296**.

Q5. Find the n th Term

1, 5, 9, 13, 17, ...

What is the n th term rule?

Differences: +4. First term: 1.
Rule: $4n - 3$

Q6. Challenge

The n th term of a sequence is $10 - 2n$.

Which is the **last positive term**?

What is the **first negative term**?

$n = 4$: +2 (last positive).

$n = 5$: 0.

$n = 6$: -2 (first negative).

Retrieve and Connect

Q1. Dots



- (a) Draw the 4th shape.
(b) How many dots in shape 5?

Q5. Jake says:

"I start at 3 and add 4 each time."

- (a) Write his first 5 terms, (b) find the n th term rule, and (c) decide whether 59 is in his sequence. Show your reasoning.

Q2. Complete the Sequence

1, 4, 9, 16, __, __, __

Q3. Write the first 5 terms of $2n + 5$

_, _, __, __, _

Q4. Find the n th Term

- (a) 3, 5, 7, 9, 11, ...
(b) 6, 10, 14, 18, 22, ...

Q6. Challenge

Mia's sequence has n th term $3n + 1$.

Jake's sequence has n th term $2n + 6$.

Find the **first three values** that appear in *both* sequences. What do you notice about them?

Retrieve and Connect

Q1. Dots



- (a) Draw the 4th shape.
(b) How many dots in shape 5?

(b) Shape 5 has 17 dots

Q5. Jake says:

"I start at 3 and add 4 each time."

- (a) Write his first 5 terms, (b) find the n th term rule, and (c) decide whether 59 is in his sequence. Show your reasoning.

(a) 3, 7, 11, 15, 19.

(b) n th term: $4n - 1$.

(c) $4n - 1 = 59 \Rightarrow n = 15$. **Yes!**
(15th term)

Q2. Complete the Sequence

1, 4, 9, 16, 25, 36, 49
(square numbers, n^2)

Q3. Write the first 5 terms of $2n + 5$

7, 9, 11, 13, 15

Q4. Find the n th Term

(a) 3, 5, 7, 9, 11, ... $2n + 1$

(b) 6, 10, 14, 18, 22, ... $4n + 2$

Q6. Challenge

Mia's sequence has n th term $3n + 1$.

Jake's sequence has n th term $2n + 6$.

Find the **first three values** that appear in *both* sequences. What do you notice about them?

Shared values: 10, 16, 22, ... (they increase by 6 each time).

Retrieve and Connect

Q1. Matchstick Triangles



- (a) Draw the 4th shape.
- (b) How many matchsticks does it use?
- (c) Which times tables does the sequence represent?

Q2. Complete the Sequence

4, 8, 12, 16, __, __, __

Q3. The 3 times table has n th term rule $3n$, what is the n th term rule for the 5 times table? __

Q4. Write the first 5 terms of $3n + 4$

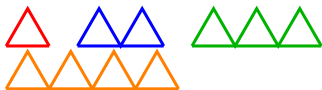
__, __, __, __, __

Q5. A sequence is made by taking the 3 times table and subtracting 2 from every term.

- (a) Write the first 5 terms.
- (b) What is the n th term rule?
- (c) Use your rule to find the **20th** term.
- (d) Is **100** in the sequence? Show your working clearly.

Retrieve and Connect

Q1. Matchstick Triangles



- (a) Draw the 4th shape.
- (b) How many matchsticks does it use?
- (c) Which times tables does the sequence represent?

(b) 12 matchsticks
(c) The 3 times table

Q2. Complete the Sequence

4, 8, 12, 16, 20, 24, 28

Q3. The 3 times table has n th term rule $3n$, what is the n th term rule for the 5 times table? $5n$

Q4. Write the first 5 terms of $3n + 4$

7, 10, 13, 16, 19

Q5. A sequence is made by taking the 3 times table and subtracting 2 from every term.

- (a) Write the first 5 terms.
- (b) What is the n th term rule?
- (c) Use your rule to find the 20th term.
- (d) Is 100 in the sequence? Show your working clearly.

(a) 1, 4, 7, 10, 13. (b) $3n - 2$. (c) $3 \times 20 - 2 = 58$.
(d) $3n - 2 = 100 \Rightarrow 3n = 102 \Rightarrow n = 34$. Yes, 100 is the 34th term.

Retrieve and Connect

Q1. Dots



- (a) Draw the 4th picture.
- (b) How many dots does it contain?
- (c) Which times table does the sequence represent?

Q2. Complete the Sequence

5, 10, 15, 20, __, __, __

Q3. Write the first 5 terms of $4n - 3$

_, _, _, _, _

Q4. Start with the **5 times table** and **add 1** to every term.

- (a) Write the first 5 terms.
- (b) What is the n th term rule?
- (c) Find the 20th term.
- (d) Is **104** in the sequence? Explain how you know.

Retrieve and Connect

Q1. Dots



- (a) Draw the 4th picture.
- (b) How many dots does it contain?
- (c) Which times table does the sequence represent?

(b) 16 dots
(c) The 4 times table

Q2. Complete the Sequence

5, 10, 15, 20, 25, 30, 35

(add 5 each time — the 5 times table)

Q3. Write the first 5 terms of $4n - 3$

1, 5, 9, 13, 17

Q4. Start with the 5 times table and add 1 to every term.

- (a) Write the first 5 terms.
 - (b) What is the n th term rule?
 - (c) Find the 20th term.
 - (d) Is 104 in the sequence? Explain how you know.
- (a) 6, 11, 16, 21, 26. (b) $5n + 1$. (c) $5 \times 20 + 1 = 101$.
(d) $5n + 1 = 104 \Rightarrow 5n = 103 \Rightarrow n = 20.6$. **No**, 104 is not a term.