

# Solutions

Nov 20-18:35

1. a) Describe the sequence 1, 4, 7, 10, ....
- b) What is the value of the first term? third term?
- c) Explain how to find which term has a value of 19.

a) Adding 3

b) 1<sup>ST</sup> term = 1  
3<sup>RD</sup> term = 7

c) Keep counting on 3 until you get to 19. It will be the 7<sup>TH</sup> term.

Nov 27-15:47

2. Brian and Leanne each got a different value for the  $n$ th of the pattern shown in the table. Who is correct? Why? What mistake did the other person make.

Term	Value	Pattern
1	$6 = 3 + 3$	$3 \times 2$
2	$9 = 3 + 3 + 3$	$3 \times 3$
3	$12 = 3 + 3 + 3 + 3$	$3 \times 4$
4	$15 = 3 + 3 + 3 + 3 + 3$	$3 \times 5$



The value of the  $n$ th term is  $3n$ .

The value of the  $n$ th term is  $3(n + 1)$ .



6, 9, 12, 15  
 Brian says its  $3n \Rightarrow \times$   
 Leanne says  $3(n+1) \Rightarrow \checkmark$   
 $n =$  position of each term.

Nov 27-15:48

5. Examine the pattern of equilateral triangles.



- a) Describe the relationship between the number of triangles and the perimeter of the shape.
- b) Write a formula to model the perimeter of a row of triangles.
- c) Find the perimeter of a shape with 14 triangles.

a) 

# $\Delta$ s	1	2	3	4
Perimeter	3	4	5	6

  
 For each extra triangle the perimeter increases by 1.

b) Let  $P =$  perimeter and  $n =$  # of triangles.  
 $P = n + 2$

c)  $n = 14 \Rightarrow P = 14 + 2$   
 $P = 16$  units

Nov 27-15:48

6. Look at the pattern of cubes. Each cube has a smiley face sticker on every exposed face.



- Describe the relationship between the number of cubes and the number of smiley faces.
- Develop an equation to model the number of smiley faces.
- How many smiley faces are on 10 cubes?

# of Cubes	1	2	3
# of Stickers	6	10	14

Adding on 4

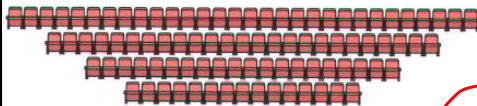
b) Let  $T =$  total # of stickers  
and  $n =$  # of cubes.

$$T = 4n + 2$$

c)  $n = 10 \Rightarrow T = 4(10) + 2$   
 $T = 40 + 2$   
 $T = 42$  stickers

Nov 27-15:48

7. A theatre has 15 seats in the first row, 20 seats in the second row, 25 seats in the third row, and so on.



- Describe the pattern.
- Use a table to show the number of seats in each of the first five rows.
- Develop a formula to model the number of seats in the  $n$ th row.
- How many seats are in the 16th row?

Row #	1	2	3	4	5
# of Seats	15	20	25	30	35

c) Let  $S =$  # of Seats and  
 $n =$  row #

$$S = 5n + 10$$

d)  $n = 16$        $S = 5(16) + 10$   
 $= 80 + 10$   
 $= 90$  seats

Nov 27-15:48

8. A marching band has 3 musicians in the first row, 5 musicians in the second row, 7 musicians in the third row, and so on.



- a) Explain the pattern in words.  
 b) Model the number of musicians in the  $n$ th row using a formula.  
 c) How many musicians are in the 10th row?

a) Adding 2

b) Let  $M = \#$  of musicians and  $n = \text{row } \#$

$$M = 2n + 1$$

c)  $n = 10$   
 $M = 2(10) + 1$   
 $M = 20 + 1$   
 $M = 21 \text{ musicians}$

Nov 27-15:49

9. Copy and complete a table of values for each sequence. Show the first six terms.

Term	Value

- a)  $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \dots$   
 b) 486, 162, 54, 18, ...  
 c) 5, 8, 11, 14, ...  
 d) 99, 90, 81, 72, ...

Term	(a)	(b)	(c)	(d)
1	1/3	486	5	99
2	1/4	162	8	90
3	1/5	54	11	81
4	1/6	18	14	72
5	1/7	6	17	63
6	1/8	2	20	54

Nov 27-15:49

10. Look at the sequence

$$1^2 + 1, 2^2 + 2, 3^2 + 3, 4^2 + 4, \dots$$

- Describe how the value of each term is related to the term number.
- Which term in the sequence has a value of 12?
- Write an expression for the value of the  $n$ th term.

a) Square the term # and then add the term #.

b) 3<sup>rd</sup> term does  $(3^2 + 3 = 12)$

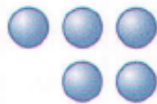
c)  $n^2 + n$

Nov 27-15:49

11. Study the pattern of marbles.



Term 1



Term 2



Term 3

Copy and complete the table for the first six terms. Then, find an expression for the value of the  $n$ th term.

Term, $n$	Number of Marbles, $m$	Pattern
1	3	$1 + 2 \times 1$
2	5	$1 + 2 \times 2$
3	7	$1 + 2 \times 3$
4	9	$1 + 2 \times 4$
5	11	$1 + 2 \times 5$
6	13	$1 + 2 \times 6$

Let  $M = \#$  of marbles and  $n = \text{term \#}$   
 $M = 2n + 1$

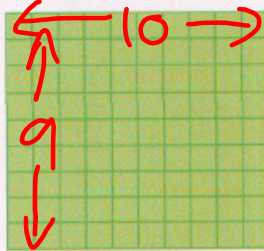
Nov 27-15:50

14. Examine the pattern of squares. The table shows how many squares are in each figure.



Figure	Number of Squares	Pattern
1	2	$1 \times 2$
2	6	$2 \times 3$
3	12	$3 \times 4$
4	20	$4 \times 5$

- a) Find the number of squares in the seventh figure of the pattern.
- b) Another figure in the pattern is shown. Which figure number is it? Justify your answer.



$$56 \quad (7 \times 8)$$

$$9 \times 10 \Rightarrow 9^{\text{th}} \text{ figure}$$

$$\text{Rule is figure \#} \\ \times (\text{figure \#} + 1)$$

Nov 27-15:50