



**THIRD SPACE
LEARNING**

Number Patterns Worksheet

Algebra

Grades 9 to 12

Questions

Name:

Date:

- 1 Circle the triangular numbers.

10 15 20 25 30 35 40 45

- 2 21 is the 6th triangular number. What is added to 21 to find the 7th triangular number?

Answer

- 3 What is the next triangular number after 78?

Answer

- 4 Calculate the 25th triangular number.

Answer

- 5 Calculate the 40th triangular.

Answer

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- 6 A sequence is defined by the recursive formula $a_{n+1} = a_n - 8$ and $a_1 = 12$. Find the next four terms of the sequence.

Answer

- 7 A sequence is defined by the explicit formula $a_n = a_1 + 2(n - 1)$ and $a_1 = -8$. Find the next four terms of the sequence.

Answer

- 8 A sequence is defined by the recursive formula $a_{n+1} = \frac{1}{5}a_n$ and $a_0 = 625$. Find the next four terms of the sequence.

Answer

- 9 A sequence is defined by the explicit formula $a_n = a_1(r)^{n-1}$ and $a_1 = \frac{1}{3}$ and $r = 9$. Find the next four terms of the sequence.

Answer

- 10 Define the sequence 7, 14, 21, 28, 35, ... using a recursive formula.

Answer

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- 11 Define the sequence $-2, -4, -8, -16, \dots$ using an explicit formula.

Answer

- 12 Define the sequence $\frac{1}{8}, 1\frac{1}{4}, 12\frac{1}{2}, 125, \dots$ using a recursive formula.

Answer

- 13 Define the sequence $7, 7.3, 7.6, 7.9, \dots$ using an explicit formula.

Answer

- 14 Define the sequence $134, 122, 110, 98, 86, \dots$ using a recursive formula.

Answer

- 15 The recursive formula for an arithmetic sequence is $a_{n+1} = a_n + 35$ and $a_1 = -2$. What is the explicit formula?

Answer

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- 16 The explicit formula for an arithmetic sequence is $a_n = \frac{2}{3} + 5(n - 1)$. What is the recursive formula?

Answer

- 17 The recursive formula for a geometric sequence is $a_{n+1} = 12a_n$ and $a_1 = -1.04$. What is the explicit formula?

Answer

- 18 The explicit formula for a geometric sequence is $a_n = 4\left(-\frac{1}{5}\right)^{n-1}$. What is the recursive formula?

Answer

- 19 The explicit formula for an arithmetic sequence is $a_n = 10 + 8(n - 1)$. Which answer choices represent the sequence? Select **all** the correct answers.
- a) $a_n = 8n + 2$
 - b) $a_{n+1} = 8n$ and $a_1 = 10$
 - c) Sequence terms: 18, 26, 34, 42
 - d) $a_{n+1} = a_n + 8$ and $a_1 = 10$
 - e) Sequence terms: 80, 88, 96, 104

Answer

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20 The explicit formula for a geometric sequence is $a_n = -\frac{1}{4}(8)^{n-1}$. Which answer choices represent the sequence? Select **all** the correct answers.

a. Sequence terms: $-\frac{1}{4}, -1, -4, -8$

b. $a_{n+1} = -2^n$

c. $a_n = -\frac{1}{4}(8)^{n-1}$

d. Sequence terms: $-2; 16; -128; 1,024$

e. $a_{n+1} = 8a_n$ and $a_1 = -\frac{1}{4}$

Answer

Answers

Question number	Question	Answers	Standard
1	Circle the triangular numbers. 10 15 20 25 30 35 40 45	10, 15, 45	HSF-LE.A.2
2	21 is the 6th triangular number. What is added to 21 to find the 7th triangular number?	7	HSF-LE.A.2
3	What is the next triangular number after 78?	91	HSF-LE.A.2
4	Calculate the 25th triangular number.	$T_{25} = \frac{1}{2}25(25 + 1)$ $= 325$	HSF-LE.A.2
5	Calculate the 40th triangular.	$T_{40} = \frac{1}{2}40(40 + 1)$ $= 820$	HSF-LE.A.2
6	A sequence is defined by the recursive formula $a_{n+1} = a_n - 8$ and $a_1 = 12$. Find the next four terms of the sequence.	4, -4, -12, -20	HSF.BF.A.1, HSF.BF.A.2
7	A sequence is defined by the explicit formula $a_n = a_1 + 2(n - 1)$ and $a_1 = -8$. Find the next four terms of the sequence.	-6, -4, -2, 0	HSF.BF.A.1, HSF.BF.A.2

Number Patterns Worksheet | Grades 9 to 12 | Answers

Question number	Question	Answers	Standard
8	A sequence is defined by the recursive formula $a_{n+1} = \frac{1}{5}a_n$ and $a_0 = 625$. Find the next four terms of the sequence.	125, 25, 5, 1	HSF.BF.A.1, HSF.BF.A.2
9	A sequence is defined by the explicit formula $a_n = a_1(r)^{n-1}$ and $a_1 = \frac{1}{3}$ and $r = 9$. Find the next four terms of the sequence.	3; 27; 243; 2,187	HSF.BF.A.1, HSF.BF.A.2
10	Define the sequence 7, 14, 21, 28, 35, ... using a recursive formula.	$a_{n+1} = a_n + 7, a_1 = 7$	HSF.BF.A.1, HSF.BF.A.2
11	Define the sequence -2,-4, -8, -16,... using an explicit formula.	$a_n = -2(2)^{n-1}$	HSF.BF.A.1, HSF.BF.A.2
12	Define the sequence 18, 114, 1212, 125... using a recursive formula.	$a_{n+1} = 10a_n, a_1 = \frac{1}{8}$	HSF.BF.A.1, HSF.BF.A.2
13	Define the sequence 7, 7.3, 7.6, 7.9,... using an explicit formula.	$a_n = 7 + 0.3(n - 1)$	HSF.BF.A.1, HSF.BF.A.2
14	Define the sequence 134, 122, 110, 98, 86, ... using a recursive formula.	$a_{n+1} = a_n - 12, a_1 = 134$	HSF.BF.A.1, HSF.BF.A.2
15	The recursive formula for an arithmetic sequence is $a_{n+1} = a_n + 35$ and $a_1 = -2$. What is the explicit formula?	$a_n = -2 + 35(n - 1)$	HSF.BF.A.1, HSF.BF.A.2

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Question number	Question	Answers	Standard
16	The explicit formula for an arithmetic sequence is $a_n = \frac{2}{3} + 5(n - 1)$. What is the recursive formula?	$a_{n+1} = \frac{2}{3} + a_n + 5$ and $a_1 = \frac{2}{3}$	HSF.BF.A.1, HSF.BF.A.2
17	The recursive formula for a geometric sequence is $a_{n+1} = 12a_n$ and $a_1 = -1.04$. What is the explicit formula?	$a_n = -1.04(12)^{n-1}$	HSF.BF.A.1, HSF.BF.A.2
18	The explicit formula for a geometric sequence is $a_n = 4(-\frac{1}{5})^{n-1}$. What is the recursive formula?	$a_{n+1} = -\frac{1}{5}a_n$ and $a_1 = 4$	HSF.BF.A.1, HSF.BF.A.2
19	The explicit formula for an arithmetic sequence is $a_n = 10 + 8(n - 1)$. Which answer choices represent the sequence? Select all the correct answers. a. $a_n = 8n + 2$ b. $a_{n+1} = 8n$ and $a_1 = 10$ c. Sequence terms: 18, 26, 34, 42 d. $a_{n+1} = a_n + 8$ and $a_1 = 10$ e. Sequence terms: 80, 88, 96, 104	a, c, d	HSF.BF.A.1, HSF.BF.A.2
20	The explicit formula for a geometric sequence is $a_n = -\frac{1}{4}(8)^{n-1}$. Which answer choices represent the sequence? Select all the correct answers. a. Sequence terms: $-\frac{1}{4}, -1, -4, -8$ b. $a_{n+1} = -2^n$ c. $a_n = -\frac{1}{4}(8)^{n-1}$ d. Sequence terms: -2; 16; -128; 1,024 e. $a_{n+1} = 8a_n$ and $a_1 = -\frac{1}{4}$	b, e	HSF.BF.A.1, HSF.BF.A.2

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