Concept 16: Arithmetic & Geometric Sequences

Level 4 Example Question
Write an equation for this geometric sequence and find the 10th term of the sequence.
3, 6, 12, 24, 48, ...

Level 3 Example Question
Write an equation for this arithmetic sequence and find the 30th term of the sequence
3, 9, 15, 21, 27, ...

Level 2 Example Question
Identify whether these sequences are arithmetic or geometric
1, 3, 9, 27, 81, ...
3, 7, 11, 15, 19, ...

(C) Level 2
1. INTRODUCTION: Take Notes & Basic Practice
   - Mr. Sieling’s Video
   - Alternate Video
   - From Other Source
     | Mr. Sieling’s Website | Videos are on Mr. Sieling’s Website |

2. PRACTICE ACTIVITIES: (Complete at least 2)
   - IXL Practice
     | P1 (Alg1) | (At least to 90) | Score = __________ |
     | Level 2: Arithmetic & Geometric Sequences |
   - Buzzmath
     | Patterns & Sequences |
   - Create
     | Define arithmetic sequence and/or geometric sequence |

3. QUIZ (Level 2)
   - Schoology Quiz: Level 2 – Arithmetic & Geometric Sequences

4. REMEDIATION
   - Correct Mistakes on Quiz and Do Another Practice Activity
   - Mr. Sieling’s Signature ____________________________

Pre-Quiz Score = ____/5
Score 5 = Level 4
Score 3,4 = Level 3
Score 0,1,2 = Level 2
(B) Level 3

1. **INTRODUCTION**: Take Notes & Basic Practice

<table>
<thead>
<tr>
<th>Mr. Sieling's Video</th>
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<tbody>
<tr>
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2. **PRACTICE ACTIVITIES**: (Complete at least 2)

<table>
<thead>
<tr>
<th>IXL Practice</th>
<th>Worksheet</th>
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<tbody>
<tr>
<td>P2 (Alg1)</td>
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<tr>
<td>(At least to 80)</td>
<td>Level 3: Arithmetic &amp; Geometric Sequences</td>
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<tr>
<td>Score = ________</td>
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<thead>
<tr>
<th>Buzzmath</th>
<th>Create</th>
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<tbody>
<tr>
<td>Sequences: Finding the Next Term</td>
<td>An example of an Arithmetic Sequence including the first 5 terms, equation and explanation</td>
</tr>
</tbody>
</table>

3. **QUIZ** (Level 3)

Schoology Quiz: Level 3 – Arithmetic & Geometric Sequences

4. **REMEDIATION**

Correct Mistakes on Quiz and Do Another Practice Activity

Mr. Sieling’s Signature

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(A) Level 4

1. **INTRODUCTION**: Take Notes & Basic Practice

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2. **PRACTICE ACTIVITIES**: (Complete at least 2)

<table>
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<tr>
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<tr>
<td>P6 (Alg1)</td>
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<td>(at least to 90)</td>
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<tbody>
<tr>
<td>Sequences: Using a Formula to Find Terms</td>
<td>An example of a Geometric Sequence Including the first 5 terms, equation and explanation</td>
</tr>
</tbody>
</table>

3. **QUIZ** (Level 2)

Schoology Quiz: Level 4 – Arithmetic & Geometric Sequences

4. **REMEDIATION**

Correct Mistakes on Quiz and Do Another Practice Activity

Mr. Sieling’s Signature

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Concept 16 | Arithmetic & Geometric Sequences
## Notes Level 2:

### Goals:
- Identify Arithmetic and Geometric Sequences
- Find the next term in an arithmetic sequence
- Find the next term in a geometric sequence

### Notes:

<table>
<thead>
<tr>
<th>Big Ideas</th>
<th>Examples/Details</th>
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Level 2 Practice:

For each sequence, state if it is arithmetic, geometric, or neither.

1) $-3, -18, -108, -648, -3888, ...$
2) $2, 4, 12, 48, 240, ...$

3) $-35, 165, 365, 565, 765, ...$
4) $-2, 6, -18, 54, -162, ...$

5) $-7, 93, 193, 293, 393, ...$
6) $8, 14, 20, 26, 32, ...$

7) $-1, -2, -6, -24, -120, ...$
8) $-18, -12, -6, 0, 6, ...$

9) $-2.5, -5, -10, -20, -40, ...$
10) $1, 2, 6, 24, 120, ...$

Find the next three terms in each sequence.

11) $2, 4, 12, 48, 240, ...$
12) $2, 5, 10, 17, 26, ...$

13) $1, 9, 25, 49, 81, ...$
14) $4, 16, 36, 64, 100, ...$

15) $-6, -2, 0, 1, \frac{3}{2}, ...$
16) $-9, -7, -4, 0, 5, ...$

17) $-2, -4, -12, -48, -240, ...$
18) $6, 8, 11, 15, 20, ...$

19) $-30, -14, -6, -2, 0, ...$
20) $-2, 1, 6, 13, 22, ...$

Summary of Identifying Arithmetic & Geometric Sequences
Worksheet Level 2:

Goals:
- Identify Arithmetic and Geometric Sequences
- Find the next term in an arithmetic sequence
- Find the next term in a geometric sequence

Practice #1

Does this pattern represent an arithmetic or geometric sequence? Explain.

Find how many dots would be in the next figure?

Practice #2

Does this pattern represent an arithmetic or geometric sequence? Explain.

Find how many cubes would be in the next figure?
### Practice #3

State whether the sequence is arithmetic or geometric. Then find the next three terms in each sequence.

1) 2, 8, 32, 128, 512, ...
2) 3, 12, 48, 192, 768, ...

3) $-35, -32, -29, -26, -23, ...$
4) $-24, -14, -4, 6, 16, ...$

5) 3, $-9, 27, -81, 243, ...$
6) $-1, -4, -16, -64, -256, ...$

7) 1, 2, 4, 8, 16, ...
8) $-12, -3, 6, 15, 24, ...$

9) $-8, -6, -4, -2, 0, ...$
10) 3, 11, 19, 27, 35, ...

### Practice #4

Draw the next term if this represents an arithmetic sequence.

Find the number of cubes in the next three figures.

Draw the next term if this represents a geometric sequence.

Find the number of cubes in the next three figures.
Notes Level 3:

**Goals:**

- Write an equation for an arithmetic sequence
- Use an equation to find the Nth term of an arithmetic sequence

**Notes:**

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Level 3 Basic Practice:

For each sequence, state if it is arithmetic, geometric, or neither.

1) 0, 6, −6, 18, −30, ...
2) −1, 6, −36, 216, −1296, ...
3) 1, 8, 15, 22, 29, ...
4) −34, −40, −46, −52, −58, ...
5) 18, 27, 36, 45, 54, ...
6) 8, 12, 16, 20, 24, ...

Find the explicit formula and the three terms in the sequence after the last one given.

7) −4, −7, −10, −13, ...
8) −26, −34, −42, −50, ...
9) 23, 32, 41, 50, ...
10) −9, −5, −1, 3, ...
11) −14, 6, 26, 46, ...
12) −21, −51, −81, −111, ...
13) −33, −31, −29, −27, ...
14) 3, −17, −37, −57, ...
15) −1, −11, −21, −31, ...
16) −34, −25, −16, −7, ...

Summary of Writing an Equation for an Arithmetic Sequence
Worksheet Level 3:

Goals:
Write an equation for an arithmetic sequence
Use an equation to find the Nth term of an arithmetic sequence

Practice #1

How many squares are being added for each step?

How many squares were in “term 0?”

How many squares will be in the next term?

Write an expression to represent this arithmetic sequence.

Practice #2
Draw a pattern that represents an arithmetic expression with a rate of change = 3.

Expression:

Drawings:

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
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### Practice #3

Determine if the sequence is arithmetic. If it is, find the 52nd term and the explicit formula.

1) 8, 16, 24, 32, ...

2) −24, −14, −4, 6, ...

3) 23, 28, 33, 38, ...

4) −26, −28, −30, −32, ...

5) 37, 39, 41, 43, ...

6) 8, −1, −10, −19, ...

7) 37, −163, −363, −563, ...

8) −8, 2, 12, 22, ...

9) 37, 17, −3, −23, ...

10) 12, 8, 4, 0, ...
## Goals:
- Write an equation for a geometric sequence
- Use an equation to find the Nth term of a geometric sequence

## Notes:

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Concept # ________
Basic Practice:

For each sequence, state if it is arithmetic, geometric, or neither.

1) 2.5, 10, 40, 160, 640, ...

2) 20, 50, 80, 110, 140, ...

3) -24, -16, -8, 0, 8, ...

4) 1, 3, 9, 27, 81, ...

Write the expression for each arithmetic sequence.

5) 36, 39, 42, 45, ...

6) -21, 79, 179, 279, ...

7) 23, 53, 83, 113, ...

8) -33, -23, -13, -3, ...

Find the explicit formula and the three terms in the sequence after the last one given.

9) -2, -4, -8, -16, ...

10) -1, -5, -25, -125, ...

11) 4, 8, 16, 32, ...

12) -1, -4, -16, -64, ...

13) 2, -8, 32, -128, ...

14) 1, 6, 36, 216, ...

Summary of Writing an Expression for a Geometric Sequence
Worksheet Level 4:

**Goals:**
- Write an equation for a geometric sequence
- Use an equation to find the Nth term of a geometric sequence

**Practice #1**

Explain what is happening in each step?

How many circles were in “term 0”?

How many circles will be in the next term?

Write an expression to represent this geometric sequence.

**Practice #2**

Draw a pattern that represents an geometric expression with a growth factor = 3.

Expression:

Drawings:

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Practice #4

For each sequence, state if it is arithmetic, geometric, or neither.

1) -4, -20, -100, -500, -2500, ...

2) -23, -3, 17, 37, 57, ...

3) 4, 9, 14, 19, 24, ...

4) -4, -16, -64, -256, -1024, ...

State whether the sequence is arithmetic or geometric. Write an expression for the sequence. Find the 10th term of the sequence.

5) -32, -22, -12, -2, 8, ...

6) 32, 42, 52, 62, 72, ...

7) 1, -2, 4, -8, 16, ...

8) -4, 20, -100, 500, -2500, ...

9) 1, 5, 25, 125, 625, ...

10) 0.5, 1, 2, 4, 8, ...

11) 16, 18, 20, 22, 24, ...

12) -4, -24, -144, -864, -5184, ...

13) 2, 8, 32, 128, 512, ...

14) 1, 2, 4, 8, 16, ...

Given the explicit formula for a geometric sequence find the 8th term.

15) \(a_n = 2^{n-1}\)

16) \(a_n = -2 \cdot (-2)^{n-1}\)

17) \(a_n = 2 \cdot 2^{n-1}\)

18) \(a_n = 2 \cdot (-3)^{n-1}\)

19) \(a_n = -3 \cdot 2^{n-1}\)

20) \(a_n = -4 \cdot (-2)^{n-1}\)