Geometric sequences and series

Date_____ Period____

Determine if the sequence is geometric. If it is, find the common ratio, the 8th term, and the explicit formula.

1) $-1,\ -4,\ -16,\ -64,\ ...$

A) Common Ratio: $r = -3$
$a_8 = -2187$
Explicit: $a_n = (-3)^{n-1}$

B) Common Ratio: $r = -4$
$a_8 = -16384$
Explicit: $a_n = (-4)^{n-1}$

C) Common Ratio: $r = 3$
$a_8 = -2187$
Explicit: $a_n = -3^{n-1}$

D) Common Ratio: $r = 4$
$a_8 = -16384$
Explicit: $a_n = -4^{n-1}$

2) $1,\ 4,\ 16,\ 64,\ ...$

A) Common Ratio: $r = 4$
$a_8 = 16384$
Explicit: $a_n = 4^{n-1}$

B) Common Ratio: $r = \frac{1}{3}$
$a_8 = \frac{1}{2187}$
Explicit: $a_n = \left(\frac{1}{3}\right)^{n-1}$

C) Common Ratio: $r = \frac{1}{4}$
$a_8 = \frac{1}{16384}$
Explicit: $a_n = \left(\frac{1}{4}\right)^{n-1}$

D) Common Ratio: $r = 3$
$a_8 = 2187$
Explicit: $a_n = 3^{n-1}$

3) $3,\ -18,\ 108,\ -648,\ ...$

4) $-4,\ -12,\ -36,\ -108,\ ...$

Given the explicit formula for a geometric sequence find the first five terms and the 8th term.

5) $a_n = -3 \cdot 5^{n-1}$

6) $a_n = 2 \cdot \left(-\frac{1}{4}\right)^{n-1}$

Given two terms in a geometric sequence find the recursive formula.

7) $a_2 = 6$ and $a_5 = 48$

A) $a_n = a_{n-1} \cdot 2$
$a_1 = 3$

B) $a_n = a_{n-1} \cdot 2$
$a_1 = 6$

C) $a_n = a_{n-1} \cdot 2$
$a_1 = 7$

D) $a_n = a_{n-1} \cdot 2$
$a_1 = 5$

8) $a_1 = 1$ and $a_6 = -7776$

A) $a_n = a_{n-1} \cdot -6$
$a_1 = -6$

B) $a_n = a_{n-1} \cdot 6$
$a_1 = -1$

C) $a_n = a_{n-1} \cdot 4$
$a_1 = -6$

D) $a_n = a_{n-1} \cdot -6$
$a_1 = 1$

Evaluate each geometric series described.

9) $1 + 4 + 16 + 64..., \ n = 7$

10) $4 + 16 + 64 + 256..., \ n = 9$

11) $\sum_{n=1}^{9} 4^{n-1}$

12) $\sum_{k=1}^{10} -2 \cdot 4^{k-1}$

Algebra 2 Name_____ ID: 1

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C) Common Ratio: $r = 3$
$a_8 = -2187$
Explicit: $a_n = -3^{n-1}$

*D) Common Ratio: $r = 4$
$a_8 = -16384$
Explicit: $a_n = -4^{n-1}$

2) $1,\ 4,\ 16,\ 64,\ \ldots$

*A) Common Ratio: $r = 4$
$a_8 = 16384$
Explicit: $a_n = 4^{n-1}$

B) Common Ratio: $r = \frac{1}{3}$
$a_8 = \frac{1}{2187}$
Explicit: $a_n = \left(\frac{1}{3}\right)^{n-1}$

C) Common Ratio: $r = \frac{1}{4}$
$a_8 = \frac{1}{16384}$
Explicit: $a_n = \left(\frac{1}{4}\right)^{n-1}$

D) Common Ratio: $r = 3$
$a_8 = 2187$
Explicit: $a_n = 3^{n-1}$

3) $3,\ -18,\ 108,\ -648,\ \ldots$

Common Ratio: $r = -6$
$a_8 = -839808$
Explicit: $a_n = 3 \cdot (-6)^{n-1}$

4) $-4,\ -12,\ -36,\ -108,\ \ldots$

Common Ratio: $r = 3$
$a_8 = -8748$
Explicit: $a_n = -4 \cdot 3^{n-1}$

Given the explicit formula for a geometric sequence find the first five terms and the 8th term.

5) $a_n = -3 \cdot 5^{n-1}$

First Five Terms: $-3,\ -15,\ -75,\ -375,\ -1875$

$a_8 = -234375$

6) $a_n = 2 \cdot \left(-\frac{1}{4}\right)^{n-1}$

First Five Terms: $2,\ -\frac{1}{2},\ \frac{1}{8},\ -\frac{1}{32},\ \frac{1}{128}$

$a_8 = -\frac{1}{8192}$

Given two terms in a geometric sequence find the recursive formula.

7) $a_2 = 6$ and $a_5 = 48$

*A) $a_n = a_{n-1} \cdot 2$
$a_1 = 3$

B) $a_n = a_{n-1} \cdot 2$
$a_1 = 6$

C) $a_n = a_{n-1} \cdot 2$
$a_1 = 7$

D) $a_n = a_{n-1} \cdot 2$
$a_1 = 5$

8) $a_1 = 1$ and $a_6 = -7776$

A) $a_n = a_{n-1} \cdot -6$
$a_1 = -6$

B) $a_n = a_{n-1} \cdot 6$
$a_1 = -1$

C) $a_n = a_{n-1} \cdot 4$
$a_1 = -6$

*D) $a_n = a_{n-1} \cdot -6$
$a_1 = 1$

Evaluate each geometric series described.

9) $1 + 4 + 16 + 64..., \ n = 7$

5461

10) $4 + 16 + 64 + 256..., \ n = 9$

349524

11) $\sum_{n=1}^{9} 4^{n-1}$

87381

12) $\sum_{k=1}^{10} -2 \cdot 4^{k-1}$

−699050