LESSON MAKER PRO

Ratio Road Trip

Build, model, and solve geometric sequences.

HIGH SCHOOL · MA.912.AR.10.2

MA.912.AR.10.2 "Given a mathematical or real-world context, write and solve problems involving geometric sequences."

NAME _____ DATE _____

THE BIG IDEA

In a geometric sequence, you multiply each term after the first by the same common ratio. Use a_n = a1*r^(n-1) to find any term. When the ratio is negative, the signs of the terms alternate.

WORKED EXAMPLE

A geometric sequence has a1 = 5 and r = 2. Find a5.

1. Use a_n = a1*r^(n-1).
2. a5 = 5*2^(5-1)
3. a5 = 5*2^4 = 5*16

Answer: a5 = 80

PRACTICE 6 problems

1 Find the next two terms: 6, 18, 54, ...

ANSWER _____

2 For a geometric sequence, a1 = 9 and r = 1/3. Find a3.

ANSWER _____

3 Write an explicit rule for the sequence 10, -30, 90, -270, ...

ANSWER _____

4 A geometric sequence has a1 = 12 and a3 = 108. The common ratio is positive. Find a6.

ANSWER _____

5 What term number is 3159 in the sequence 13, 39, 117, ...?

ANSWER _____

6 A geometric sequence is defined by a1 = 14 and a_n = -6a_(n-1). Find a3.

ANSWER _____

APPLY IT Show your work

1 A student's art video gets 32 reposts on its first day. Each day, the number of reposts is 3 times the number from the day before. Write an expression for the number of reposts on day 7, then find the number of reposts.

WORK SPACE

ANSWER _____

2 An online game offers 729 points at level 1. Each new level offers 1/3 as many points as the level before it. Write an expression for the points at level 7, then find the number of points.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A geometric sequence has a3 = 54 and a6 = 1,458. The common ratio is positive. Find a1 and r. Explain how you used the two given terms.

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_____

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the next two terms: 6, 18, 54, ...	**162, 486**
2	For a geometric sequence, a1 = 9 and r = 1/3. Find a3.	**1**
3	Write an explicit rule for the sequence 10, -30, 90, -270, ...	**a_n = 10(-3)^(n-1)**
4	A geometric sequence has a1 = 12 and a3 = 108. The common ratio is positive. Find a6.	**2916**
5	What term number is 3159 in the sequence 13, 39, 117, ...?	**The sixth term, a6**
6	A geometric sequence is defined by a1 = 14 and a_n = -6a_(n-1). Find a3.	**504**

PART 2 · APPLY IT

1. **32*3^6 = 23,328 reposts** Day 7 is the seventh term, so multiply the first-day amount by 3 six times. Compute 32*3^6 = 23,328.
2. **729*(1/3)^6 = 1 point** Level 7 is found by multiplying 729 by 1/3 six times. Since 3^6 = 729, the result is 1.

CHALLENGE

a1 = 6 and r = 3. From a6/a3 = r^3, 1,458/54 = 27 = 3^3, so r = 3. Then 54 = a1*3^2, so a1 = 6.

Accept equivalent explicit rules, such as 10(-3)^(n-1). For items that state the ratio is positive, accept only the positive common ratio.