Section 7-8
Geometric Sequences

Students will be able to write and use recursive formulas for geometric sequences.

Aug 18-2:52 PM

Imagine working for a clothing store. Each week that a coat that costs $80 doesn't sell, it gets marked down by 20%. What is the cost for the coat on after 3 weeks?

$80 - (80(.2)) = \$64$

$64 - (64(.2)) = \$51.20$

$51.20 - (51.20(.2)) = \$40.96$

This is an example of a geometric sequence.

Aug 18-2:52 PM

In a *geometric sequence*, the ratio of any term to its preceding value is constant. Such as marking it down 20% each time, for example.

Aug 18-2:52 PM

In the sequence,

$a, ar, ar^2, ar^3, \ldots$

A **recursive formula** has 2 parts:

$a_1 = a$ Initial condition

$a_n = a_{n-1} \cdot r$ Recursive formula

Aug 18-2:52 PM

In the sequence,

$a, ar, ar^2, ar^3, \ldots$

An **explicit definition** is a single formula:

$a_n = a_1 \cdot r^{n-1}$

Aug 18-2:52 PM

Every geometric sequence has a starting value and a common ratio. The starting value and common ratio define a unique geometric sequence.

Aug 18-2:52 PM

Identifying Geometric Sequences:

Look for a common ratio:

a). 3, 6, 12, 24, 48, . . .
b). 3, 6, 9, 12, 15, . . .
c). 4, 7, 11, 16, 22, . . .

Aug 18-2:52 PM

Any geometric sequence can be written as a recursive or explicit formula.

-The recursive formula is useful for finding the next term.

-The explicit formula is more useful for finding the *n*th term.

Aug 18-2:52 PM

Find the explicit and recursive formulas:

2, 4, 8, 16, . . .

Rec: $a_1 = 2$, $a_n = a_{n-1} \cdot 2$

Exp: $a_n = 2 \cdot (2)^{n-1}$

$a_5 = 16 \cdot 2 = 32$

$a_5 = 2(2)^4 = 32$

40, 20, 10, 5, . . .

Rec: $a_1 = 40$, $a_n = a_{n-1} \cdot \frac{1}{2}$

$a_{100} = 6.3 \times 10^{-29}$

Exp: $a_n = 40 \cdot (\frac{1}{2})^{n-1}$

Aug 18-2:52 PM

Write the recursive and explicit formula. Then find the 8th term.

14, 84, 504, 3024, . . .

Aug 18-2:52 PM

Hwk: pg. 470 - 471
#10, 11, 16, 22, 30,
38 - 48 evens

Quiz tomorrow 7.5 - 7.8

Mar 23-3:36 PM