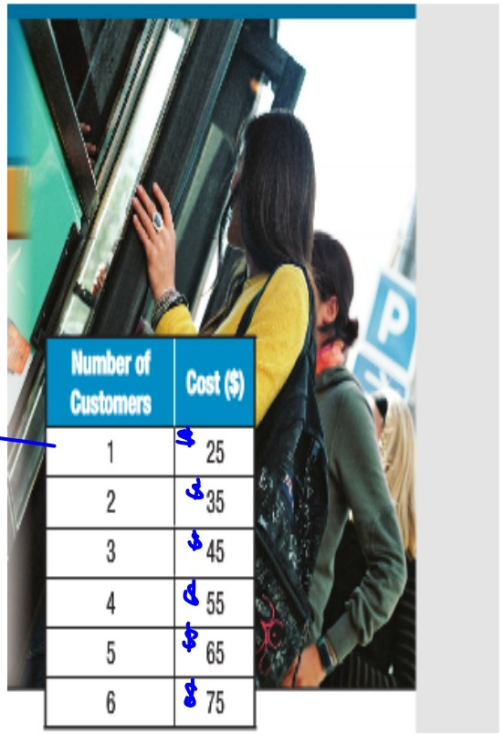
Algebra 1 7.8
Use a recursive formula to list terms in a sequence
Write recursive formulas for arithmetic and geometric sequences

sequence
arithmetic sequence
common difference (d)
geometric sequence
common ratio (r)
combination sequence (could be anything...)
recursive formula



Number of Customers	Cost ($)
1	$ 25
2	$ 35
3	$ 45
4	$ 55
5	$ 65
6	$ 75

$25
explicit +10
$= 10x + 25$
$10(x-1)$

First: break the code. What are they saying?

Example 1 Use a Recursive Formula

Find the first five terms of the sequence in which $a_1 = 7$ and $a_n = 3a_{n-1} - 12$, if $n \geq 2$.

1st term is..

$= 3(\ ) - 12$

1	7
2	9
3	15
4	33
5	87

What's the rule? formula
(helps to say it in words)
a_1 = first term
a_n = next term
$a_{(n-1)}$ = previous term
domain
Can help to use a table

GuidedPractice

1. Find the first five terms of the sequence in which $a_1 = -2$ and $a_n = (-3)(a_{n-1}) + 4$, if $n \geq 2$.

Table

1	-2
2	10
3	-26
4	82
5	-242

$-3(-2)+4$

$-3(10)+4$

$-3(-26)+4$

$-3(82)+4$

First 5

$a_1 = 7$ $\quad a_n = 4a_{n-1} + 6$ if $n \geq 2$

1	7
2	34
3	142
4	574
5	2302

$4(7) + 6$

$4(34) + 6$

$4(142) + 6$

$4(574) + 6$

Example 2 Write Recursive Formulas

Write a recursive formula for each sequence.

a. 17, 13, 9, 5, ...

What's the rule?
what is first term?
d=? (or r=?)
+ d (or x r)

1. What is the rule?
2. State first term
3. State domain n≥2 (always)

next term = previous term + d

1	17
2	13
3	9
4	5

$a_1 = 17$

$a_n = a_{n-1} - 4$

$n \geq 2$

b. 6, 24, 96, 384, …

1	6
2	24
3	96
4	384

$a_1 = 6$

$a_n = 4 \cdot a_{n-1}$

$n \geq 2$

next term = previous term x r

GuidedPractice

2B. 9, 36, 63, 90, …

1	9
2	36
3	63
4	90

$a_1 = 9$

$a_n = a_{n-1} + 27$

$n \geq 2$

Example 4 Translate between Recursive and Explicit Formulas

a. Write a recursive formula for $a_n = 6n + 3$.

Write out 3 or 4 terms (table?)
Look for the pattern
Write the equation (7.7)

	$6n+3$	
1	$6 \cdot 1 + 3$	9
2	$6 \cdot 2 + 3$	15
3	$6 \cdot 3 + 3$	21
4	$6 \cdot 4 + 3$	27

1	9
2	15
3	21
4	27

$a_1 = 9$

$a_n = a_{n-1} + 6$

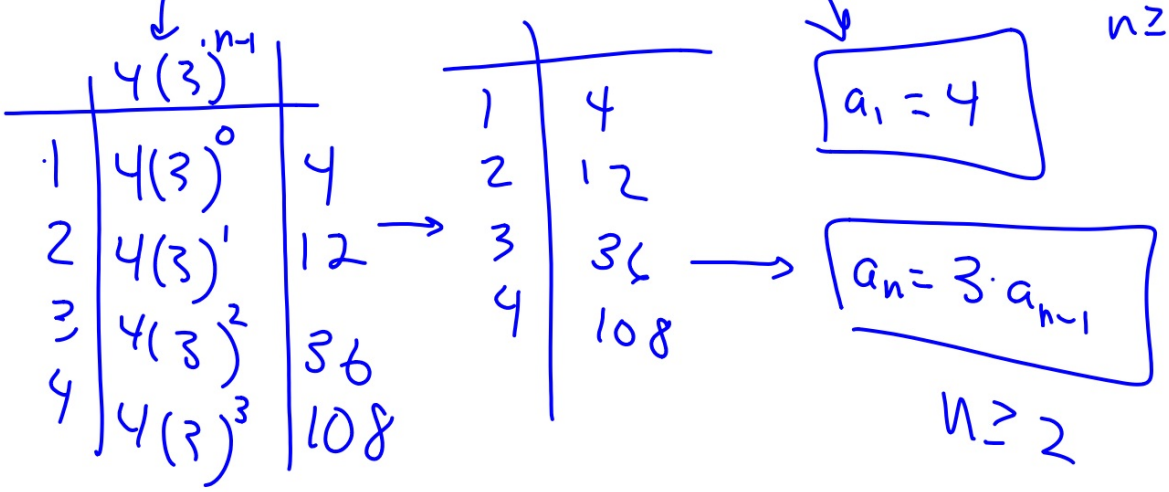
$n \geq 2$

try making a table...

1ST term
rule
$n \geq 2$

GuidedPractice

4A. Write a recursive formula for $a_n = 4(3)^{n-1}$.



$n \geq 2$

7.8 p. 448

11-22 all

↑

0