Warmup 11/(8+9)

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Get a calculator!!!

1. WHY is this sequence called an "arithmetic" sequence?
2. Give an example of a sequence that would NOT be arithmetic.
3. Write an explicit rule that would give the **nth** term of the sequence.
4. Use your rule to find the 100th term.

10, 14, 18, 22, …

Explicit Rule

- **Explicit rule:** a rule that tells you how to get the **nth** term of the sequence without having to find the previous terms

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Explicit Formula for Arithmetic Sequences:

$$a_n = a_1 + d(n-1)$$

- a_1 is the first term
- d is the common difference
- n is the position number

Write the Explicit Formula for the Sequence

15, 12, 9, 6,…

$$a_n = 15 - 3(n-1)$$

Use your rule to find the 43rd term.
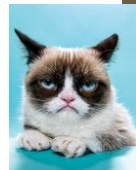

Check Homework

Word Problem Time!

A bag of cat food weighs 18 pounds on the first day. Each day afterwards, the cats are fed 0.5 pound of food.

1. Write an explicit rule to model the situation.
2. How much does the bag of cat food weigh after 30 days?

1. $a_n = 18 - .5(n-1)$

2. 3.5 pounds

1

Word Problem Time!

Each time a truck stops, it drops off 250 pounds of cargo. After the first stop, it had a load of 2000 pounds.

1. Write an explicit rule to model the situation.
2. How much does the load weigh after the 5th stop?

1. $a_n = 2000 - 250(n -1)$

2. 1000 pounds

Objective

Be able to interpret and create rules for Arithmetic and Geometric Sequences

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Geometric Sequences

- **Geometric Sequence:** When the terms in the sequence have a **common ratio (r)**
  - (Basically, a sequence that is exponential)
- Can you give an example of a geometric sequence?

Is it a geometric sequence?

- If so, give the common ratio **r**.

1. 5, 10, 20, 40...   Yes, r = 2
2. 2, 6, 24, 72, ...   No, no common ratio
3. 40, 60, 90, 135, ...   Yes, r = 1.5
4. 320, 80, 20, 5, ...   Yes, r = ¼ or 0.25
5. 7, 70, 700, 7000, ...   Yes, r = 10
6. 5, 15, 25, 35, ...   No, no common ratio (it's arithmetic!)
7. 500, 550, 605, 665.5, ...   Yes, r = 1.1

Find the indicated term of the geometric sequence.

8th term: 5, 10, 20, 40, …

640

Find the indicated term of the geometric sequence.

9th term: 7, 21, 63, 189, …

45,927

Find the indicated term of the geometric sequence.

6th term: 13, -26, 52, -104, …

-416

Find the indicated term of the geometric sequence.

The 25th term: a_1 = 100; r = 1.02

About 160.84

- The explicit formula for geometric sequences uses similar thinking to the formula for arithmetic sequences:
- "What is the first term, and how many times do I multiply by "r" to get the nth term?"
- To get the nth term, you multiply by "r" (n – 1) times.
- In other words, you must multiply by r^{n-1}

Explicit Formula for Geometric Sequences:

$a_n = a_1(r)^{(n-1)}$

- a_1 is the first term
- r is the common ratio
- n is the position number

Write the explicit formula of the geometric sequence, then use it to find the given term.

a_1 = 8; r = 5; The 10th term

$a_n = 8(5)^{n-1}$
$a_{10} = 8(5)^9 = 15,625,000$

Write the explicit formula of the geometric sequence, then use it to find the given term.

3, 12, 48, 192, … 5th term

$a_n = 3(4)^{n-1}$
$a_5 = 3(4)^4 = 768$

Homework:
Half Sheet