What is the difference between an arithmetic and a geometric sequence?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 13, Lesson 1
1. Warm Up
2. Sequences and Series
3. ICA
4. STUDY!

Sequences and Series

What is the difference between an arithmetic and a geometric sequence?

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Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up: On your reference sheet, find the formulas for

	Sequences	*Series*
Arithmetic:		
Geometric:		

Standard 1.7 and 1.8

Sequences and Series

Sequence: -A simple *PATTERN*

Series: -*ADDING UP* a simple pattern

Arithmetic: -To move from one term to the next, you *ADD* a common difference

Sequence $u_n = u_1 + (n-1)d$ Arithmetic.pdf

Series $S_n = \frac{n}{2}(u_1 + u_n)$ Arithmetic SUM

Geometric: -To move from one term to the next, you *MULTIPLY* a common ratio

Sequence $u_n = u_1 r^{n-1}$ geometric.pdf

Series $S_n = \frac{u_1(r^n - 1)}{r - 1}$ geometric sum.pdf

Summary: Explain what is the fundamental difference between arithmetic and geometric sequences. Then, explain the difference in the affect on the terms

Example 1: Find the 9^{th} term of the sequence below, and then find the sum of the sequence of the 9 terms

$$64 , 60 , 56 , \ldots , u_9$$

-4 -4

$u_n = u_1 + (n-1)d$

$64 + (9-1)(-4)$

$u_9 = 32$

$u_n = \frac{n}{2}(u_1 + u_n)$

$\frac{9}{2}(64 + 32)$

$S_9 = 432$

Example 2: Find the 35^{th} term of the sequence below, then find the sum of the sequence of the 35 terms

$$32768 , 16384 , 8192 , \ldots u_{35}$$

$\times \frac{1}{2}$ $\times \frac{1}{2}$

$u_n = u_1 r^{n-1}$

Example 3: First, assume the sequence is arithmetic. Find the 10^{th} term. Then, pretend the sequence is geometric. Find the 10^{th} term.

$$2 , 4 , \ldots , u_{10}$$

Order Correctly

Given the 6 problems below, order the answers from least to greatest

1. U_{10} of $\frac{1}{3}, 1, 3, \ldots, u_{10}$

2. S_{10} of $2, 5, 8, \ldots, u_{10}$

3. U_5 of $3, 9, \ldots, u_5$

4. S_5 of $64, 32, 16, \ldots, u_5$

5. U_{25} of $2, 4, 6, \ldots, u_{25}$

6. S_{50} of $64, 32, 16, \ldots, u_{50}$

How can money be worth the same amount, but have different values

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 13, Lesson 2
1. Warm-up
2. Currency Conversion
3. ICA
4. STUDY!

Currency Conversion
How can money be worth the same amount, but have different values?

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Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up:

1) Robert can either be paid $50 to start and earn a $15 raise each day, or he can be paid $800 to start and have his daily pay cut in *eighths*. If he plans on working for 10 days, which plan is best?

$S_n = \frac{n}{2}(u_1 + u_n)$

$S_{10} = \frac{10}{2}(50 + 185) = \$1,175$

$u_n = u_1 + (n-1)d$

$u_{10} = 50 + (10-1)15$

$u_{10} = 185$

$S_n = \frac{u_1(r^n - 1)}{r-1}$

$S_{10} = \frac{\left(800\left(\frac{1}{8}^{10} - 1\right)\right)}{\left(\left(\frac{1}{8}\right) - 1\right)}$

$(800((1\div 8)\wedge 10 - 1)) \div ((1\div 8) - 1)$

$\$914.28$

Notes Notes

Currency Conversion

Converting Units:

-Identify the starting amount

-Set up the giant fraction bar

$$\frac{100 \text{ dollars}}{1 \text{ dollar}} \quad \frac{13 \text{ pesos}}{}$$

-You can only cancel out a unit when it is on top AND bottom of the fraction bar

$$\frac{100 \cdot 13}{1}$$

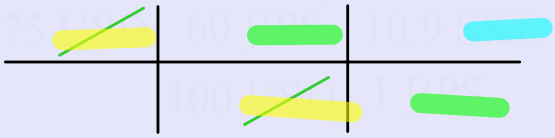
-Multiply across the top

-Multiply across the bottom

100 dollars = 1,300 pesos

-Simplify the answer

Example 1: Mr. Henderson takes his life savings to Europe, all 75 dollars (USD). In London, 100 USD is worth 60 pounds (BPS). Then he is traveling to Sweden. 1 BPS is worth 10.9 Swedish Krona (SKE). How much is Mr. Henderson's $75 worth in Swedish Krona?



$$\frac{75 \cdot 60 \cdot 10.9}{100 \cdot 1} = 490.5 \text{ SKE}$$

Example 2: While traveling to Europe, Greg had 1,500 dollars (USD). In Spain, they only accept euros (EUR). 100 USD converts to 72 EUR. Greg spent 42 euros in Spain before leaving for London. In London, they only accept pounds (GBP). 100 EUR converts to 83 GBP. He spent 100 pounds in London. How much money did he have in USD after the trip?

$$\frac{1500 \text{ USD}}{1} \cdot \frac{72 \text{ EUR}}{100 \text{ USD}} = \frac{1500 \cdot 72}{100} = 1080 \text{ EUR}$$

$$1080 \text{ EUR} - 42 \text{ EUR} = 1038 \text{ EUR}$$

$$\frac{1038 \text{ EUR}}{1} \cdot \frac{83 \text{ GBP}}{100 \text{ EUR}} = \frac{1038 \cdot 83}{100} = 861.54 \text{ GBP}$$

$$861.54 \text{ GBP} - 100.00 \text{ GBP} = 761.54 \text{ GBP}$$

$$\frac{761.54 \text{ GBP}}{1} \cdot \frac{100 \text{ EUR}}{83 \text{ GBP}} \cdot \frac{100 \text{ USD}}{72 \text{ EUR}} = \frac{761.54 \cdot 100 \cdot 100}{83 \cdot 72}$$

Greg has $ 1,274.33 (USD) left after his trip.

Summary:

ICA:

Week 13 Leson 2 ICA Homework.docx

Country	Money	$1 US in Foreign Currency	Foreign Currency in $1 US
Britain	Pound	0.49	2.04
France	Euro	0.73	1.38
Mexico	Pesos	10.78	0.09
China	Yuan	7.57	0.13
Japan	Yen	121.82	0.008

5 USD | 10.78 P
1 USD

1) 5 dollars = 2.45 pounds

2) 10 dollars = _____ euros

3) 50 dollars = _____ pesos

4) 150 dollars = _____ Yuan

5) 1000 dollars = _____ yens

6) 5000 yen = _____ dollars

7) 650 Yuan = _____ dollars

8) 850 euros = _____ dollars

9) 700 pounds = _____ dollars

10) 500 pesos = _____ dollars

The Port of Long Beach charges ships for the time they are at the dock being loaded and unloaded. The length of the vessel determines the daily charge. A ship that is 200 meters long must pay $2,882.00 per day.

11) If the ship is from China, how many Yuan would the company pay for each day?

12) If the ship was from France, how many euros would the company pay for each day?

Answers:

Country	Money	$1 US in Foreign Currency	Foreign Currency in $1 US
Britain	Pound	0.49	2.04
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Mexico	Pesos	10.78	0.09
China	Yuan	7.57	0.13
Japan	Yen	121.82	0.008

1) 5 dollars = 2.45 pounds

2) 10 dollars = 7.30 euros

3) 50 dollars = 539 pesos

4) 150 dollars = 1,135.5 Yuan

5) 1000 dollars = 121,820 yens

6) 5000 yen = 40 dollars

7) 650 Yuan = 84.50 dollars

8) 850 euros = 1,173 dollars

9) 700 pounds = 1,428 dollars

10) 500 pesos = 45 dollars

The Port of Long Beach charges ships for the time they are at the dock being loaded and unloaded. The length of the vessel determines the daily charge. A ship that is 200 meters long must pay $2,882.00 per day.

11) If the ship is from China, how many Yuan would the company pay for each day?

21,816.74 Yuan

12) If the ship was from France, how many euros would the company pay for each day?

2,103. 86 euros

ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity

How can I use this information to help chose a bank account?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 13, Lesson 3

1. Warm-up
2. Simple and Compound Interest
3. Notebook check
4. STUDY!

Simple and Compound Interest

How can I use this information to help chose a bank account?

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Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up: From your IB reference sheet, find the formula for Simple and Compound Interest

Simple Interest

Compound Interest

Interest

Principle: -The original balance

r: -The annual interest RATE being applied

k: -The number of compound periods *per year*

n: -The number of years
-You may also use *t* for time

Simple Interest: -Interest is applied only on the *principle balance* at the end of the year

-This gives the amount of INTEREST, not the balance of the account

$$I = P \cdot \left(\frac{r}{100} \right) \cdot t$$

Compound Interest: -Interest is applied multiple times per year
-Interest builds on itself

$$A = P \cdot \left(1 + \frac{r}{100 \cdot k} \right)^{k \cdot n}$$

Summary:

Practice Problems

Example 1- Robert owes $10,000 in student loans, but he doesn't have to start paying it off yet. His APR is 9% and is compounded daily. What will the balance be for his student loans after 1 year? 3 years? 5 years?

$$FV = PV \times \left(1+\frac{r}{100k}\right)^{kn}$$

$$FV = 10000 \times \left(1+\frac{9}{100(365)}\right)^{(365)(1)}$$

PV = 10000
r = 9
k = 365
n = 1

10000 x (1+(9÷(100x365)))^(365x1)

Example 2- Every year, Gabby's bank gives her 4% of her initial deposit as an interest payment. She deposited $2,000 10 years ago. How much money did she profit in interest? How much money is in her account now?

$$I = P \cdot \left(\frac{r}{100}\right) \cdot t$$

P = 2000
r = 4
t = 10

$2000 \cdot \left(\frac{4}{100}\right) \cdot 10 = 800$

Gabby now has $2,800 in her account.

Savings Accounts

You have to choose between 2 different savings accounts at Wells Fargo. You are depositing $10,000

Option A offers .03% APR compounded daily

Option B offers .05% simple interest

Which option will earn you more money after 15 years? What is the difference?

Am I ready for my quiz? How did I prepare for this quiz?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 13, Lesson 4

1. Warm-up
2. Quiz Review
3. QUIZ

Quiz Review

Am I ready for my quiz?
How did I prepare for this quiz?

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Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up:

1) Kaitlin can either be paid $80 to start and earn a $20 raise each day, or she can be paid $400 to start and have her daily pay cut in *half*. If she plans on working for 5 days, which plan is best?

2. What has a greater value, the 75th term of sequence a, or the sum of the first 15 terms of sequence b?

$a = 5, 8, 11, \ldots a_{75}$ $\quad$ $b = 100, 50, 25, \ldots b_{15}$

3. 100 British Pounds (BPS) converts to 120 Euros (EUR). 1000 EUR converts to 1473 Australian Dollars (AUD). If I have 250 BPS, how much is that worth in AUD?

4. While traveling to Europe, Cynthia had 280 dollars (USD). In Spain, they only accept euros (EUR). 100 USD converts to 72 EUR. Cynthia spent 35 euros in Spain before leaving for London. In London, they only accept pounds (GBP). 100 EUR converts to 83 GBP. She spent 70 pounds in London. How much money did she have in USD after the trip?

5. Carlos took out $10,500 in student loans before starting college. His interest rate is 3.5%, compounded daily. He doesn't need to start making payments until he graduates 4 years after taking out the loans. What is the balance of his student loans when he needs to begin paying off the balance?

Finance QUIZ TIME!!

You need:

Your Calculator

A Pencil or a blue pen or a black pen

High lighters if you would like them

IB Reference Sheet

Week13 QUIZ.docx

Attachments

Arithmetic SUM.pdf

Arithmetic.pdf

geometric.pdf

geometric sum.pdf

Week13 QUIZ.docx

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