Weight at birth (5:52am): 10 lb 1 oz 161 oz

(5 oz)

12 hrs later (5:52pm): 9 lb 12 oz 156 oz

(5 oz)

12 hrs later (5:52am + 1 day): 9 lb 7 oz 151 oz

(5 oz)

12 hrs later (5:52pm + 1 day): 9 lb 2 oz 146 oz

NICU

Is this an arithmetic sequence?

+, −

Y, N

Class idiosyncracies:

*Tutorials M-Th 7:30am (any time in morning is good!)
*Deposit phone in shoe locker in order to access bathroom pass
*Tutorial videos + e-mail message with question = 10 bonus points on homework

A penny doubled for 3 weeks and you keep the final payment only,

$0.01, $0.02, $0.04 (×2, ×2)

today, tomorrow

or...

$10,000

geometric

Which option would you choose?

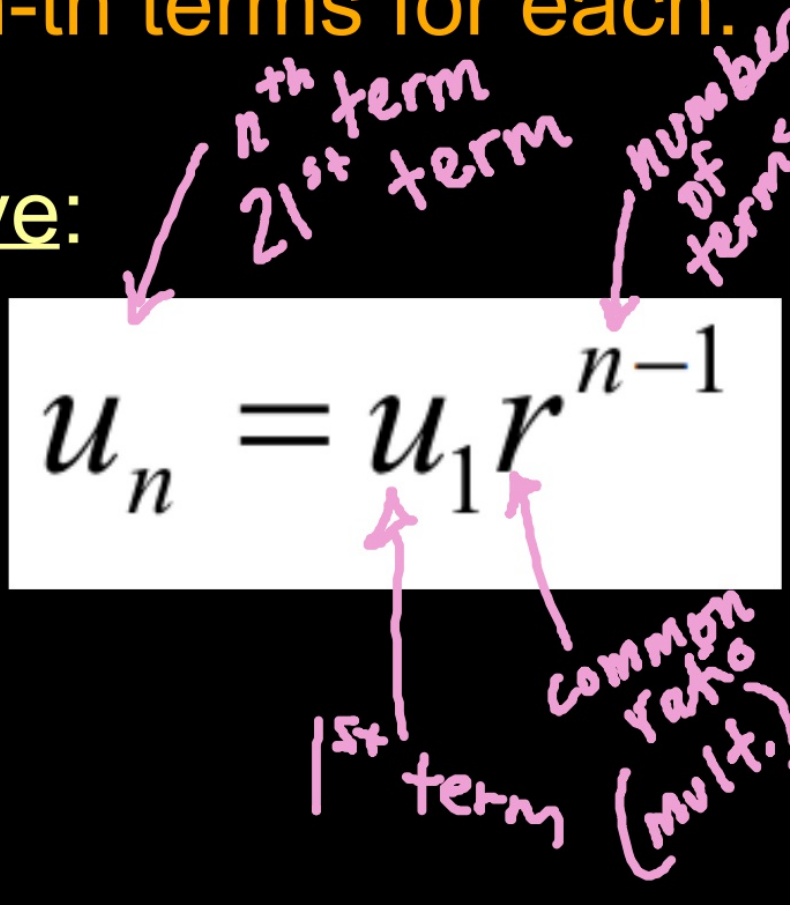
$$u_n = u_1 \cdot r^{n-1}$$

Today's learning objective:

By the end of class, I will be able to distinguish arithmetic sequences from geometric and calculate n-th terms for each.

Today's language objective:

Arithmetic sequence
Geometric sequence
n-th term
common difference
common ratio



Find the 14th term...

1, 3, 9, 27, ...

$u_{14} = 1(3)^{(14-1)}$

$u_{14} = 1(3)^{13}$

$u_{14} = 1{,}594{,}323$

$\pi^0 = 1$ $3^{0(1-1)}$

$e^0 = 1$

Challenge: Find the 14th term in the sequence:

2, –4, 8, –16...

$u_{14} = 2(-2)^{14-1}$

$u_{14} = 2(-8192)$

$u_{14} = -16384$

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

Find the 11th term...

300, 150, 75, ...

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

4 SF

4000

12,000 ← 2 SF

$u_{11} = 300(.5)^{11-1}$

$u_{11} = .293$

$= 0000.293$

.406

always multiplic

3 significant figures

- 1-9 are significant
- leading 0's are not significant
- sandwiched 0's are
- trailing 0's are (only after decimal)

Discussion/Challenge topic:

Can a sequence be both arithmetic and geometric?

19, 19, 19, 19, 19 ...

Give an example regardless of your answer.

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

0, 0, 0, 0, 0...

$U_n = U_1 + (n-1)d$ ← Arithmetic

Is the following sequence ~~arithmetic~~ or geometric?

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

2, 3, 4.5, ...

Regardless of your answer, find u_8

common ratio $= \frac{2^{nd}\text{ term}}{1^{st}\text{ term}}$

$U_8 = 2(1.5)^{8-1}$

$2(1.5)^{7}$

$2(17.086$

34.2 ⟶ 3 SF or exact

U_8 → 34.171875

In a geometric sequence, the 10th term is 39,366. the first term is 2. Find "r."

$$\frac{39{,}366}{2} = \frac{2(r)^9}{2}$$

$$\sqrt[9]{19683} = \sqrt[9]{r^9}$$

$$r = 3$$

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

$y_1 = x^9$

2nd table

$19683 = x^9$

$0 = x^9 - 19683 = Y1$

X-intercept
root
Solutions
Zeros

In the arithmetic sequence,

$u_4 = 42$ & $u_{36} = -22$; find d & u_1

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

Consider the sequence 2, 5, 8, 11...

Find n such that $U_n = 110$

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

Consider the infinite geometric sequence 25, 5, 1, 0.2, …

(a) Find the common ratio. $\frac{1}{5} = 0.2$ $\frac{5}{25}$

(b) Find

(i) the 10th term; $25(0.2)^9 = 1.28E-5$

(ii) an expression for the nth term. $25(0.2)^{n-1}$

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

.0000128

1.28×10^{-5}

sci notation

Consider the sequence 2, 5, 8, 11...

Find n such that Un = 110

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

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