

Notes 1.8 – Sequences

Warmup

Given two consecutive terms, find the first term of the sequence.

- a) **arithmetic:** $f(3) = 11$ and $f(4) = 17$ $f(0) = \underline{-7}$ $f(1) = \underline{-1}$
- | | | | |
|--|---|----|----|
| | 5 | 11 | 17 |
|--|---|----|----|
-
- b) **arithmetic:** $f(6) = 22$ and $f(7) = 18$ $f(0) = \underline{46}$ $f(1) = \underline{42}$
- | | | | | | |
|----|----|----|----|----|----|
| 2 | 3 | 4 | 5 | 6 | 7 |
| 38 | 34 | 30 | 26 | 22 | 18 |
-
- c) **geometric:** $f(4) = 12$ and $f(5) = 36$ $f(0) = \underline{\frac{4}{27}}$ $f(1) = \underline{\frac{4}{9}}$
- | | | | |
|---------------|---|----|----|
| 2 | 3 | 4 | 5 |
| $\frac{4}{3}$ | 4 | 12 | 36 |
-
- d) **geometric:** $f(3) = 48$ and $f(4) = 12$ $f(0) = \underline{3072}$ $f(1) = \underline{768}$
- | | | |
|-----|----|----|
| 2 | 3 | 4 |
| 192 | 48 | 12 |
-
- e) **arithmetic:** $f(4) = 32.6$ and $f(5) = 28.9$ $f(0) = \underline{47.4}$ $f(1) = \underline{43.7}$
- | | | | |
|----|------|------|------|
| 2 | 3 | 4 | 5 |
| 40 | 36.3 | 32.6 | 28.9 |
-
- f) **geometric:** $f(5) = 14$ and $f(6) = 7$ $f(0) = \underline{448}$ $f(1) = \underline{224}$
- | | | | | |
|-----|----|----|----|---|
| 2 | 3 | 4 | 5 | 6 |
| 112 | 56 | 28 | 14 | 7 |

Lesson

Word	Meaning/Notation	Example										
Arithmetic Means	The missing terms in an arithmetic sequence.	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><td>n</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>f(n)</td><td>4</td><td>?</td><td>?</td><td>13</td></tr> </table>	n	1	2	3	4	f(n)	4	?	?	13
n	1	2	3	4								
f(n)	4	?	?	13								
Geometric Means	The missing terms in a geometric sequence.	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><td>n</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>f(n)</td><td>1</td><td>?</td><td>?</td><td>8</td></tr> </table>	n	1	2	3	4	f(n)	1	?	?	8
n	1	2	3	4								
f(n)	1	?	?	8								

Finding the arithmetic missing terms (arithmetic means).

hints

1.

n	1	2	3
$f(n)$	5	8	11

CD: $\boxed{+3}$

- going up?
add
- going down?
subtract

2.

n	1	2	3	4	5
$f(n)$	18	11	4	-3	-10

CD: $\boxed{-7}$

- how far apart?
- count # of steps

3.

n	1	2	3	4	5	6	7
$f(n)$	12	9	6	3	0	-3	-6

CD: $\boxed{-3}$

4.

n	1	2	3	4
$f(n)$	50	62	74	86

CD: $\boxed{+12}$

5.

n	1	2	3	4	5	6	7	8
$f(n)$	-23	-19	-15	-11	-7	-3	1	5

CD: $\boxed{+4}$

6. Explain how to find arithmetic means.

$$\frac{\text{last} - \text{first}}{n - 1}$$

Finding the geometric missing terms (geometric means).

7.

n	1	2	3
$f(n)$	3	6	12

CR: $\boxed{\cdot 2}$

8.

n	1	2	3	4
$f(n)$	7	35	175	875

CR: $\boxed{\cdot 5}$

9.

n	1	2	3	4	5
$f(n)$	6	12	24	48	96

CR: $\boxed{\cdot 2}$

10.

n	1	2	3	4	5	6
$f(n)$	4	12	36	108	324	972

CR: $\boxed{\cdot 3}$

11. Explain how to find geometric means.

$$\sqrt[n-1]{\frac{\text{last}}{\text{first}}}$$

12. Key sequence to take a root on your calculator.

$\boxed{(n-1)}$ $\boxed{\text{value}}$ $\boxed{2^{\text{nd}}}$ $\boxed{\wedge}$ value