Arithmetic and Geometric Means

Finding the MISSING terms in a sequence

repeated addition of some difference

Arithmetic Means Example

x	3	4	5	6	7	8
f(x)	-2	12	26	40	54	68

7-4=3 "jumps"

-14 +d +d +d +14

To go BACKWARD to PREVIOUS term, do the INVERSE of the forward operation. In this example → -14

If I start with 12 and add a constant difference 3 (7-4) times, I get 54.

Write an equation for this. Solve it to find the difference.

$12+3d=54$

$-12 \quad -12$

$\frac{3d}{3}=\frac{42}{3}$

$d=14$

Fill in the missing values.

Determine the missing values for this arithmetic sequence. Use an equation to help solve the problem.

x	5	6	7	8	9	10
f(x)	29	20	11	2	-7	-16

+9 +d +d +d +d +d

$20+(10-6)d=-16$

$20+4d=-16$

$-20 \quad -20$

$\frac{4d}{4}=\frac{-36}{4}$

$d=-9$

#steps = difference of INPUTS

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repeated MULTIPLICATION by constant ratio

Geometric Means Example

x	3	4	5	6	7	8
f(x)	2	8	32	128	512	2048

·1/4 ·r ·r ·r ·4

To get PREVIOUS TERM use the INVERSE of forward operation In this ex: ·1/4 or ÷4

If I start with 8 and multiply a constant factor 3 (7-4) times, I get 512.

Write an equation for this. Solve it to find the factor.

$8 \cdot r \cdot r \cdot r = 512$

$\frac{8r^3}{8}=\frac{512}{8}$

$(r^3)^{1/3}=(64)^{1/3}$

"Undoing" a power of 3... we want only 1 out of 3 factors in r^3.

64 = 8 · 8 = 4 · 2 · 4 · 2

Fill in the missing values. $r=4$

Determine the missing values for this geometric sequence. Use an equation to help solve the problem.

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

·r ·r ·r ·r ·3

$4 \cdot r^{(6-1)}=972$

$\frac{4r^5}{4}=\frac{972}{4}$

$(r^5)^{1/5}=(243)^{1/5}$

$r=3$

~~XXX~~When the exponent (# steps) is EVEN, there are TWO possible solutions (+/-)!