Find the missing terms in each sequence.

Arithmetic Seq: 6, ___, ___, ___, 50

Geometric Seq: 7, ___, ___, ___, 567

Arithmetic Seq: 6, ___, ___, ___, 50

Because there is an actual middle term there are two ways to find the missing terms.

Method 1:

1st: Average the 1st and 5th terms to get the 3rd term:

$3rd\ term = \frac{6+50}{2} = 28$

2nd: Average the 1st and 3rd terms to get the 2nd term:

$2nd\ term = \frac{6+28}{2} = 17$

3rd: Average the 3rd and 5th terms to get the 4th term:

$4^{th}\ term = \frac{28+50}{2} = 39$

6, 17, 28, 39, 50

Arithmetic Seq: 6, ___, ___, ___, 50

Method 2: Write and solve an equation to find the common difference and use this to fill in the missing terms.

$6 + d + d + d + d = 50$

$6 + 4d = 50$

$4d = 44$

$d = 11$

start at 6 and keep adding 11 to find the missing terms.

6, 17, 28, 39, 50

The middle term in a geometric sequence is called the geometric mean

a, x, b, ...

x: geometric mean

The Geometric Mean of any two numbers, a & b, is always found by...

Taking the square root of their product.

Geo Mean = $\sqrt{a \cdot b}$

The geometric mean is defined as the positive value.

Geometric Seq: 7, ___, ___, ___, 567

Because there is an actual middle term there are two ways to find the missing terms.

Method 1:

1st: the 3rd term is the geometric mean of the 1st and 5th terms.

$3\text{rd term} = \sqrt{7 \cdot 567} = 63$

2nd: the 2nd term is the geometric mean of the 1st and 3rd terms.

$2\text{nd term} = \sqrt{7 \cdot 63} \doteq 21$

3rd: the 4th term is the geometric mean of the 3rd and 5th terms.

$4\text{th term} = \sqrt{63 \cdot 567} = 189$

because the common ratio could be either positive or negative the 2nd and 4th terms could be ±.

7, ± 21, 63, ±189, 567

Geometric Seq: 7, ___, ___, ___, 567

Method 2: Write an equation and solve for the common ratio and use this to find the missing terms.

$7 \cdot r \cdot r \cdot r \cdot r = 567$

$7r^4 = 567$

$\sqrt[4]{r^4} = \sqrt[4]{81}$

$r = \pm 3$

because the common ratio could be either positive or negative the 2nd and 4th terms could be ±.

7, ± 21, 63, ±189, 567

Find the number of terms in this sequence.

19, 22, 25, 28, 31, ..., 109

Arithmetic Sequence $d = 3$

Explicit formula

$a_n = 19 + 3(n-1)$

Replace a_n with last term & solve for n

$109 = 19 + 3(n-1)$

$-19 \quad -19$

$\frac{90}{3} = \frac{3(n-1)}{3}$

$30 = n - 1$

$31 = n \rightarrow$ 31 terms

Find the missing terms in each sequence.

Arithmetic Seq: 13, ___, ___, ___, ___, 83

$d = 83 - 13 = 70 \div 5 = 14$

The common differenc is 14. Starting with 13 you can find the missing terms by repeatedly adding 14.

13, 27, 41, 55, 69, 83

Geometric Seq: 8, ___, ___, ___, ___, 8192

$8 \cdot r \cdot r \cdot r \cdot r \cdot r = 8192$

$\frac{8r^5}{8} = \frac{8192}{8}$

$\sqrt[5]{r^5} = \sqrt[5]{1024}$

$r = 4$ (only one odd root of a #)

8, 32, 128, 512, 2048, 8192