Writing a sequence from two of its terms (non sequential)

Step 1) What type of sequence is given?

When given arthimetic sequence terms

Step 2) Write the definition of each term using a_1 and d

Step 3) Solve the resulting linear system

Step 4) Write the arithmetic sequence using a_1 and d

Step 5) Complete the missing terms in the sequence to check to see that rule actually works for each term

	A	B	C	D	E	F	G
=							
1	given_term1	63					
2	term_in_seq1	3					
3	given_term2	135					
4	term_in_seq2	7					
5							
6							
7							
8							
9							
10							
11							

B4 7

So we know $a_3=63$ and $a_7=135$ and we also know that this is an arithmetic sequence

so all terms must follow $a_n=a_1+(n-1)d$, including a_3 and a_7

so $a_3=a_1+(3-1)\text{d}$ or $63=a_1+2\text{d}$

so $a_7=a_1+(7-1)\text{d}$ or $135=a_1+6\text{d}$

This system can be solved a variety of ways, but basically you can subtract the higher sequence term and lower sequence term and it yields d and a_1

	A	B
1	a_1	unknown
2	a_2	unknown
3	a_3	63
4	a_4	unknown
5	a_5	unknown
6	a_6	unknown
7	a_7	135
8		
9		
10		
11		

A1 a_1

$a_7 - a_3$ implies $135 - 63 = 72$

$a_7 - a_3$ implies $(a_1 + 6d) - (a_1 + 2d) = a_1 + 6d - a_1 - 2d = 4d$

This allows us to find "d" $\quad 72 = 4d$

$$72/4 = 4d/4$$

$$18 = \mathbf{d}$$

We can now use either $63 = a_1 + 2d$ or $135 = a_1 + 6d$ to find a_1

$63 = a_1 + 2(18)$ leads to $63 = a_1 + 36$ or $a_1 = 63 - 36 = 27$

$135 = a_1 + 6(18)$ leads to $135 = a_1 + 108$ or $a_1 = 135 - 108 = 27$

so our arithmetic sequence is $a_n = 27 + (n-1)(18)$

and our finite sequence is $\{27, 45, 63, 81, 99, 117, 135\}$

Writing a sequence from two of its terms (non sequential)

Step 1) What type of sequence is given?

When given geometric sequence terms

Step 2) Write the definition of each term using a_1 and r

Step 3) Solve the resulting proportion

(I suggest putting higher sequence term (not value) on top) (this will require radical operations)

Step 4) Write the geometric sequence using a_1 and r

Step 5) Complete the missing terms in the sequence to check to see that rule actually works for each term

	A	B
=		
1	given_term1	⁻7776
2	term_in_seq1	2
3	given_term2	1
4	term_in_seq2	7
5		
6		
7		
8		
9		
10		
11		

B2 2

So we know $a_2 = {}^-7776$ and $a_7 = 1$ and we also know that this is an geometic sequence

so all terms must follow $a_n = a_1(r)^{n-1}$, including a_1 and a_7

so $a_2 = a_1 r\text{^}(2-1)$ or $^-7776 = a_1 \cdot r$

so $a_7 = a_1 r\text{^}(7-1)$ or $1 = a_1 \cdot r^6$

This system can be solved a variety of ways, but basically you can divide the higher sequence term and lower sequence term then apply necessary radical and it yields r and a_1

	Y	Z seq_1
=		
1		46656
2		-7776
3		1296
4		-216
5		36
6		-6
7		1
8		
9		
10		
11		

Z1 =a_1

a_7/a_2 implies $1/{}^{-}7776 = \frac{^{-}1}{7776}$

a_7/a_2 implies $a_1 \cdot r^6 / a_1 \cdot r = r^5$

This allows us to find "r" $r^5 = \frac{^{-}1}{7776}$ which leads to $\sqrt[5]{r^5} = \sqrt[5]{\frac{^{-}1}{7776}}$

$r = \frac{^{-}1}{6}$

I would use the smaller sequence term to use ${}^{-}7776 = a_1 \cdot r$ to find a_1

${}^{-}7776 = a_1 (\frac{^{-}1}{6})^\wedge 1$ which leads to ${}^{-}7776 = \frac{^{-}1}{6} a_1$

which leads to ${}^{-}7776 \cdot ({}^{-}6) = ({}^{-}6)(\frac{^{-}1}{6} a_1)$ or $a_1 = 46656$

so our geometric sequence is $a_n = 46656 (\frac{^{-}1}{6})^\wedge(n-1)$

and our finite sequence is $\{46656, {}^{-}7776, 1296, {}^{-}216, 36, {}^{-}6, 1\}$

Writing a sequence from two of its terms

(non sequential)

Step 1) What type of sequence is given?

When given arthimetic sequence terms

Step 2) Write the definition of each term using a_1 and d

Step 3) Solve the resulting linear system

Step 4) Write the arithmetic sequence using a_1 and d

Step 5) Complete the missing terms in the sequence to check to see that rule actually works for each term

	A	B
=		
1	given_term1	6
2	term_in_seq1	3
3	given_term2	-90
4	term_in_seq2	15
5		
6		
7		
8		
9		
10		
11		

B5

Problem 6

So we know $a_3 = 6$ and $a_{15} = {}^{-}90$ and we also know that this is an arithmetic sequence

so all terms must follow $a_n = a_1 + (n-1)d$, including a_3 and a_{15}

so $a_3 = a_1 + (3-1)\text{d}$ or $6 = a_1 + 2\text{d}$

so $a_{15} = a_1 + (15-1)\text{d}$ or ${}^{-}90 = a_1 + 14\text{d}$

This system can be solved a variety of ways, but basically you can subtract the higher sequence term and lower sequence term and it yields d and a_1

	X	Y
=		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Y15

$a_{15}-a_3$ implies $^{-}90-6={}^{-}96$

$a_{15}-a_3$ implies $(a_1+14\,\text{d})-(a_1+2\,\text{d})=a_1+14\,\text{d}-a_1-2\,\text{d}=12\,\text{d}$

This allows us to find "d" $\quad ^{-}96=12\,\text{d}$

$$^{-}96/12=12\,\text{d}/12$$

$$^{-}8=\mathbf{d}$$

We can now use either $6=a_1+2\,\text{d}$ or $^{-}90=a_1+14\,\text{d}$ to find a_1

$6=a_1+2(^{-}8)$ leads to $6=a_1+{}^{-}16$ or $a_1=6-{}^{-}16=22$

$^{-}90=a_1+14(^{-}8)$ leads to $^{-}90=a_1+{}^{-}112$ or $a_1={}^{-}90-{}^{-}112=22$

so our arithmetic sequence is $a_n=22+(n-1)(^{-}8)$

and our finite sequence is

$\{22,14,6,{}^{-}2,{}^{-}10,{}^{-}18,{}^{-}26,{}^{-}34,{}^{-}42,{}^{-}50,{}^{-}58,{}^{-}66,{}^{-}74,{}^{-}82,{}^{-}90\}$

Writing a sequence from two of its terms (non sequential)

Step 1) What type of sequence is given?

When given geometric sequence terms

Step 2) Write the definition of each term using a_1 and r

Step 3) Solve the resulting proportion

(I suggest putting higher sequence term (not value) on top)

(this will require radical operations)

Step 4) Write the geometric sequence using a_1 and r

Step 5) Complete the missing terms in the sequence to check to see that rule actually works for each term

	A	B
=		
1	given_term1	759375
2	term_in_seq1	6
3	given_term2	59049
4	term_in_seq2	11
5		
6		
7		
8		
9		
10		
11		

B5

So we know a_6 =759375 and a_{11} =59049 and we also know that this is an geometic sequence

so all terms must follow $a_n = a_1(r)^{n-1}$, including a_6 and a_{11}

so $a_6 = a_1 r\text{^}(6-1)$ or $759375 = a_1 \cdot r^5$

so $a_{11} = a_1 r\text{^}(11-1)$ or $59049 = a_1 \cdot r^{10}$

This system can be solved a variety of ways, but basically you can divide the higher sequence term and lower sequence term then apply necessary radical and it yields r and a_1

	Y	Z seq_1
=		
4		2109375
5		1265625
6		759375
7		455625
8		273375
9		164025
10		98415
11		59049
12		
13		
14		

Z11 $= z10 \cdot$ r_given

a_{11}/a_6 implies $59049/759375 = \frac{243}{3125}$

a_{11}/a_6 implies $a_1 \cdot r^{10} / a_1 \cdot r^{5} = r^5$

This allows us to find "r" $r^5 = \frac{243}{3125}$ which leads to $\sqrt[5]{r^5} = \sqrt[5]{\frac{59049}{759375}}$

$r = \frac{3}{5}$

I would use the smaller sequence term to use $759375 = a_1 \cdot r^5$ to find a_1

$759375 = a_1 (\frac{3}{5})^5$ which leads to $759375 = \frac{243}{3125} a_1$

which leads to $759375 \cdot (\frac{3125}{243}) = (\frac{3125}{243})(\frac{243}{3125} a_1)$ or $a_1 = 9765625$

so our geometric sequence is $a_n = 9765625 (\frac{3}{5})^{(n-1)}$

and our finite sequence is {9765625,5859375,3515625,2109375,1265625,759375,455625,273375,164025,98415,59049}