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	61					
2	term_in_seq1	3					
3	given_term2	137					
4	term_in_seq2	7					
5							
6							
7							
8							
9							
10							
11							

A1 *given_term1*

So we know $a_3=61$ and $a_7=137$ 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 $61=a_1+2\text{d}$

so $a_7=a_1+(7-1)\text{d}$ or $137=a_1+6\text{d}$

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	C
=			
1	a_1	unknown	
2	a_2	unknown	
3	a_3	61	
4	a_4	unknown	
5	a_5	unknown	
6	a_6	unknown	
7	a_7	137	
8			
9			
10			
11			

A1 a_1

$a_7 - a_3$ implies $137 - 61 = 76$

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

This allows us to find "d" $76 = 4d$

$76/4 = 4d/4$

$19 = \mathbf{d}$

We can now use either $61 = a_1 + 2d$ or $137 = a_1 + 6d$ to find a_1

$61 = a_1 + 2(19)$ leads to $61 = a_1 + 38$ or $a_1 = 61 - 38 = 23$

$137 = a_1 + 6(19)$ leads to $137 = a_1 + 114$ or $a_1 = 137 - 114 = 23$

so our arithmetic sequence is $a_n = 23 + (n-1)(19)$

and our finite sequence is $\{23, 42, 61, 80, 99, 118, 137\}$

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	C
=			
1	given_term1	-3125	
2	term_in_seq1	2	
3	given_term2	1	
4	term_in_seq2	7	
5			
6			
7			
8			
9			
10			
11			

A1 *given_term1*

So we know $a_2 = {}^{-}3125$ 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^(2−1) or $\quad {}^{-}3125 = a_1 \cdot r$

so $a_7 = a_1$ r^(7−1) or $\quad 1 = a_1 \cdot r^6$

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

	A	B	C
=			
1	a_2	⁻3125	
2	a_7	1	
3			
4			
5			
6			
7			
8			
9			
10			
11			

A1 a_2

a_7/a_2 implies $1/{}^{-}3125 = \frac{-1}{3125}$

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

This allows us to find "r" $r^5 = \frac{-1}{3125}$ which leads to $\sqrt[5]{r^5} = \sqrt[5]{\frac{-1}{3125}}$

$$r = \frac{-1}{5}$$

I would use the smaller sequence term to use ${}^{-}3125 = a_1 \cdot r$ to find a_1

${}^{-}3125 = a_1 \left(\frac{-1}{5}\right)^\wedge 1$ which leads to ${}^{-}3125 = \frac{-1}{5} a_1$

which leads to ${}^{-}3125 \cdot ({}^{-}5) = ({}^{-}5)\left(\frac{-1}{5} a_1\right)$ or $a_1 = 15625$

so our geometric sequence is $a_n = 15625 \left(\frac{-1}{5}\right)^\wedge(n-1)$

and our finite sequence is $\{15625, {}^{-}3125, 625, {}^{-}125, 25, {}^{-}5, 1\}$

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	C
=			
1	given_term1	6	
2	term_in_seq1	3	
3	given_term2	⁻60	
4	term_in_seq2	14	
5			
6			
7			
8			
9			
10			
11			

A1 *given_term1*

So we know $a_5 = 6$ and $a_{15} = {}^{-}60$ 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_{14}

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

so $a_{14} = a_1 + (14-1)\mathrm{d}$ or ${}^{-}60 = a_1 + 13\mathrm{d}$

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	C
=			
1	a_5	6	
2	a_15	⁻60	
3			
4			
5			
6			
7			
8			
9			
10			
11			

A1 a_5

$a_{14}-a_3$ implies $^-60-6={}^-66$

$a_{14}-a_3$ implies $(a_1+13\,d)-(a_1+2\,d)=a_1+13\,d-a_1-2\,d=11\,d$

This allows us to find "d" $\quad {}^-66=11\,d$

$$^-66/11=11\,d/11$$

$$^-6=\mathbf{d}$$

We can now use either $6=a_1+2\,d$ or $^-60=a_1+13\,d$ to find a_1

$6=a_1+2(^-6)$ leads to $6=a_1+{}^-12$ or $a_1=6-{}^-12=18$

$^-60=a_1+13(^-6)$ leads to $^-60=a_1+{}^-78$ or $a_1={}^-60-{}^-78=18$

so our arithmetic sequence is $a_n=18+(n-1)(^-6)$

and our finite sequence is

$\{18,12,6,0,{}^-6,{}^-12,{}^-18,{}^-24,{}^-30,{}^-36,{}^-42,{}^-48,{}^-54,{}^-60\}$

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	C
1	given_term1	1000000	
2	term_in_seq1	7	
3	given_term2	4096	
4	term_in_seq2	13	
5			
6			
7			
8			
9			
10			
11			

A1 *given_term1*

So we know a_7 =1000000 and a_{13} =4096 and we also know that this is an geometic sequence

so all terms must follow $a_n = a_1(r)^{n-1}$, including a_7 and a_{13}

so $a_7 = a_1$ r^(7 −1) or $1000000 = a_1 \cdot r^6$

so $a_{13} = a_1$ r^(13 −1) or $4096 = a_1 \cdot r^{12}$

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

	A	B	C
=			
1	a_2	1000000	
2	a_7	4096	
3			
4			
5			
6			
7			
8			
9			
10			
11			

A4

a_9/a_4 implies $4096/1000000 = \frac{64}{15625}$

a_9/a_4 implies $a_1 \cdot r^{12} / a_1 \cdot r^{6} = r^6$

This allows us to find "r" $r^6 = \frac{64}{15625}$ which leads to $\sqrt[6]{r^6} = \sqrt[6]{\frac{64}{15625}}$

$r = \frac{2}{5}$

I would use the smaller sequence term to use $1000000 = a_1 \cdot r^6$ to find a_1

$1000000 = a_1 (\frac{2}{5})$^6 which leads to $1000000 = \frac{64}{15625} a_1$

which leads to $1000000 \cdot (\frac{15625}{64}) = (\frac{15625}{64})(\frac{64}{15625} a_1)$ or $a_1 = 244140625$

so our geometric sequence is $a_n = 244140625 (\frac{2}{5})$^(n−1)

and our finite sequence is
{244140625,97656250,39062500,15625000,6250000,2500000,1000000,400000,160000,64000,25600,10240,4096}