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	128					
2	term_in_seq1	3					
3	given_term2	210					
4	term_in_seq2	7					
5							
6							
7							
8							
9							
10							
11							

B4 7

So we know $a_3=128$ and $a_7=210$ 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 $a_3=a_1+(3-1)d$ or $128=a_1+2d$

so $a_7=a_1+(7-1)d$ or $210=a_1+6d$

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	128
4	a_4	unknown
5	a_5	unknown
6	a_6	unknown
7	a_7	210
8		
9		
10		
11		

A1 a_1

$a_7 - a_3$ implies $210 - 128 = 82$

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

This allows us to find "d" $82 = 4d$

$82/4 = 4d/4$

$\frac{41}{2} = \mathbf{d}$

We can now use either $128 = a_1 + 2d$ or $210 = a_1 + 6d$ to find a_1

$128 = a_1 + 2(\frac{41}{2})$ leads to $128 = a_1 + 41$ or $a_1 = 128 - 41 = 87$

$210 = a_1 + 6(\frac{41}{2})$ leads to $210 = a_1 + 123$ or $a_1 = 210 - 123 = 87$

so our arithmetic sequence is $a_n = 87 + (n-1)(\frac{41}{2})$

and our finite sequence is $\left\{87, \frac{215}{2}, 128, \frac{297}{2}, 169, \frac{379}{2}, 210\right\}$

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	-500
2	term_in_seq1	2
3	given_term2	128/25
4	term_in_seq2	7
5		
6		
7		
8		
9		
10		
11		

B4 7

So we know $a_2 = {}^{-}500$ and $a_7 = \frac{128}{25}$ 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 $^{-}500 = a_1 \cdot r$

so $a_7 = a_1$ r^(7−1) or $\frac{128}{25} = a_1 \cdot r^6$

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
=		
1	a_2	-500
2	a_7	128/25
3		
4		
5		
6		
7		
8		
9		
10		
11		

B2 =given_2

a_7/a_2 implies $\frac{128}{25} / {}^-500 = \frac{{}^-32}{3125}$

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

This allows us to find "r" $r^5 = \frac{{}^-32}{3125}$ which leads to $\sqrt[5]{r^5} = \sqrt[5]{\frac{{}^-32}{3125}}$ **leads to** $r = \frac{{}^-2}{5}$

I would use the smaller sequence term to use ${}^-500 = a_1 \cdot r$ to find a_1

${}^-500 = a_1 \left(\frac{{}^-2}{5}\right)^\wedge 1$ which leads to ${}^-500 = \frac{{}^-2}{5} a_1$

which leads to ${}^-500 \cdot \left(\frac{{}^-5}{2}\right) = \left(\frac{{}^-5}{2}\right)\left(\frac{{}^-2}{5} a_1\right)$ or $a_1 = 1250$

so our geometric sequence is $a_n = 1250 \left(\frac{{}^-2}{5}\right)^\wedge(n-1)$

and our finite sequence is $\left\{1250, {}^-500, 200, {}^-80, 32, \frac{{}^-64}{5}, \frac{128}{25}\right\}$

Writing a sequence from two of its terms

(non sequential)

Step 1) What type of sequence is given?

When given arthimetic sequence terms

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Step 3) Solve the resulting linear system

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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	64
2	term_in_seq1	3
3	given_term2	⁻20
4	term_in_seq2	17
5		
6		
7		
8		
9		
10		
11		

A8

So we know $a_5=64$ and $a_{15}={}^{-}20$ 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 $a_3=a_1+(3-1)\text{d}$ or $64=a_1+2\text{d}$

so $a_{14}=a_1+(17-1)\text{d}$ or ${}^{-}20=a_1+16\text{d}$

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_5	64
2	a_15	⁻84
3		
4		
5		
6		
7		
8		
9		
10		
11		

B2 ⁻84

$a_{14} - a_3$ implies $^{-}20 - 64 = {}^{-}84$

$a_{14} - a_3$ implies $(a_1 + 16d) - (a_1 + 2d) = a_1 + 16d - a_1 - 2d = 14d$

This allows us to find "d" $^{-}84 = 14d$

$^{-}84/14 = 14d/14$

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

We can now use either $64 = a_1 + 2d$ or $^{-}20 = a_1 + 16d$ to find a_1

$64 = a_1 + 2(^{-}6)$ leads to $64 = a_1 + {}^{-}12$ or $a_1 = 64 - {}^{-}12 = 76$

$^{-}20 = a_1 + 16(^{-}6)$ leads to $^{-}20 = a_1 + {}^{-}96$ or $a_1 = {}^{-}20 - {}^{-}96 = 76$

so our arithmetic sequence is $a_n = 76 + (n-1)(^{-}6)$

and our finite sequence is

$\{76, 70, 64, 58, 52, 46, 40, 34, 28, 22, 16, 10, 4, {}^{-}2\}$

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

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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	200
2	term_in_seq1	7
3	given_term2	6075/128
4	term_in_seq2	12
5		
6		
7		
8		
9		
10		
11		

B4 12

Problem 9

So we know $a_7=200$ and $a_{13}=\frac{6075}{128}$ 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 $200=a_1 \cdot r^6$

so $a_{13}=a_1$ r^(12−1) or $\frac{6075}{128}=a_1 \cdot r^{11}$

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
=		
1	a_2	200
2	a_7	6075/128
3		
4		
5		
6		
7		
8		
9		
10		
11		

A1 a_2

a_9/a_4 implies $\frac{6075}{128}/200=\frac{243}{1024}$

a_9/a_4 implies $a_1 \cdot r^{11}/a_1 \cdot r^{6}=r^5$

This allows us to find "r" $r^5=\frac{243}{1024}$ which leads to $\sqrt[5]{r^5}=\sqrt[5]{\frac{243}{1024}}$

$r=\frac{3}{4}$

I would use the smaller sequence term to use $200=a_1 \cdot r^6$ to find a_1

$200=a_1\left(\frac{3}{4}\right)^6$ which leads to $200=\frac{729}{4096}a_1$

which leads to $200\cdot\left(\frac{4096}{729}\right)=\left(\frac{4096}{729}\right)\left(\frac{729}{4096}a_1\right)$ or $a_1=\frac{819200}{729}$

so our geometric sequence is $a_n=\frac{819200}{729}\left(\frac{3}{4}\right)^{(n-1)}$

and our finite sequence is $\left\{\frac{819200}{729},\frac{204800}{243},\frac{51200}{81},\frac{12800}{27},\frac{3200}{9},\frac{800}{3},200,150,\frac{225}{2},\frac{675}{8},\frac{2025}{32},\frac{6075}{128},\frac{18225}{512}\right\}$