

Chapter 1 / **Example 23**

Finding the sum of a geometric series

Determine how many terms are required for the sum of the geometric series given by

$$\sum_{i=1}^n 3 \times 2^i \text{ to exceed } 1000.$$

Press $[f1]$ $[y=]$ to display the equation entry screen.

Press $[\alpha]$ $[f2]$ 2:summation $\Sigma($

The template has spaces for the variable, i , the limits and the function.

Plot1	Plot2	Plot3
$\Sigma($		
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$\Sigma($		

Type $I = 1$, X and 3×2^I in the first equation as Y_1 .

Press $[\text{enter}]$.

Plot1	Plot2	Plot3
$\Sigma($		
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Press $[2\text{nd}]$ $[f5]$ (table).

You can scroll down the table using \downarrow .

From the table, when 8 or more terms are added, the sum exceeds 1000.

X	Y1			
1	6			
2	18			
3	42			
4	90			
5	186			
6	378			
7	762			
8	1530			
9	3066			
10	6138			
11	12282			

$Y_1=1530$

Instead of using the summation function, you can use the

$$\text{result: } \sum_{i=1}^n 3 \times 2^i = \frac{6(1-2^n)}{1-2}.$$

Press $[f1]$ $[y=]$ to display the equation entry screen.

Type $\frac{6(1-2^X)}{1-2}$ using the fraction template $\frac{\Box}{\Box}$ $[f1]$ 1:n/d in the second equation as Y_2 .

Plot1	Plot2	Plot3
$\Sigma($		
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Press $[2\text{nd}]$ $[f5]$ (table).

The values calculated for the sum are the same in Y_2 as they are in Y_1 .

X	Y1	Y2		
1	6	6		
2	18	18		
3	42	42		
4	90	90		
5	186	186		
6	378	378		
7	762	762		
8	1530	1530		
9	3066	3066		
10	6138	6138		
11	12282	12282		

$X=1$

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