

Name: Answer key

Date: 11/10/25

Session 13

1. Find the first 5 terms of the sequence.
Determine whether or not the sequence is arithmetic.
If it is, find the "d" value.

a) $a_n = 8 + 13n$

21, 34, 47, 60, 73
 $\begin{array}{ccccccc} & \vee & & \vee & & \vee & \\ & +13 & & +13 & & +13 & \end{array}$

arithmetic!

$d = 13$

b) $a_n = \frac{1}{n+1}$

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}$
 $\begin{array}{ccccccc} & & & \vee & & \vee & \\ & & & +1/20 & & +1/30 & \end{array}$

not arithmetic

2. Find the nth term of the sequence, then find the 20th term

a) $a_1 = 2$ and $d = 3$

$a_n = 3n - 1$

$a_{20} = 3(20) - 1$

$a_{20} = 59$

arithmetic

$a_1 + (n-1)d$

$2 + (n-1)3$

$2 + 3n - 3$

b) -6, -4, -2
 $\begin{array}{ccccccc} & \vee & & \vee & & & \\ & +2 & & +2 & & & \end{array}$

$a_n = -6 + (n-1)2$

$a_1 = -6$

$d = 2$

$-6 + 2n - 2$
 $a_n = 2n - 8$

$a_{20} = 2(20) - 8$ $a_{20} = 32$

3. Find a_1 and r for the following geometric sequence

3, 6, 12, 24, 48, ...

formulas to remember:

$$a_1 = 3$$

$$a_n = a_1(r)^{n-1} \quad \frac{a_2}{a_1} \rightarrow \frac{6}{3} \rightarrow 2 = r$$

$$\frac{a_2}{a_1} = r$$

$$a_n = 3(2)^{n-1}$$

4. Find the partial sum S_n for the geometric sequence with $a_1 = 2$ and $r = 3$

$$n = 6 \quad a_1 = 2 \quad r = 3$$

$$S_6 = \frac{2(1-3^6)}{1-3} \quad (1-729)$$

$$S_6 = \frac{2(-728)}{-2}$$

$$S_6 = 728$$

$$S_n = \frac{a_1(1-r^n)}{1-r} \quad r \neq 1$$

$$\frac{a_2}{a_1} = r$$

4. Find the sum of the following infinite geometric sequence

$$14, 7, 7/2, 7/4, \dots$$

$$r = \frac{a_2}{a_1}$$

$$\frac{7}{14} = \frac{1}{2} = r$$

Infinite geometric sequences
Equation

$$S = \frac{14}{1 - \frac{1}{2}} = \frac{14}{\frac{1}{2}} \rightarrow \frac{14}{1} \cdot \frac{2}{1} \rightarrow \boxed{28}$$

$$S = \frac{a_1}{1-r}$$

$$\frac{a_2}{a_1} = r$$

, using a table

5. Parametric equations: graph the following parametric equations, then eliminate the parameter to find one equation

table $x = t + 1$

t	x	y
0	1	0
1	2	1/2
2	3	2/3
3	4	3/4
4	5	4/5
5	6	5/6

$$y = \frac{t}{t+1}$$

$$x = t + 1$$

$$x - 1 = t$$

$$y = \frac{x-1}{(x-1)+1} \rightarrow y = \frac{x-1}{x-1+1} \rightarrow \boxed{y = \frac{x-1}{x}}$$

✓

6. Find the parametric equations, given a
Slope of $(1/2)$ passing through $(1, -1)$

(rises 1 up

runs 2 right

$$x = 1 + 2t$$

$$y = -1 + t$$