

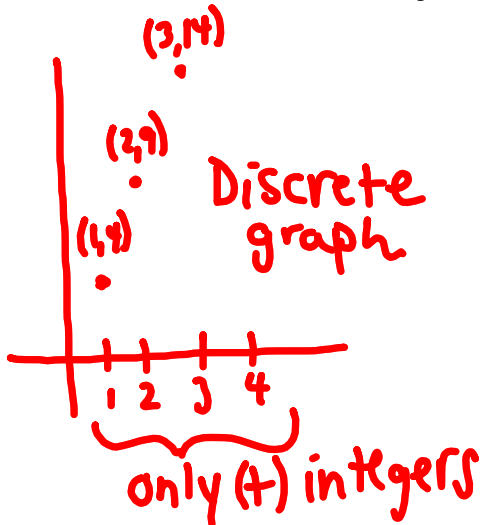
HAT  
Arithmetic Sequences

2/28/18

Ex#1: Given the sequence 4, 9, 14, 19, **24 29 34 39**

8th term

- Classify this pattern as arithmetic, geometric, or neither
- Graph. (Hint: How can a sequence be thought of as a set of ordered pairs?)
- Find an equation for this pattern.
- Use two different ways to find the 8th term.



$$t_8 = 5(8) - 1$$

$$t_8 = 39$$

EXPLICIT

$$t_n = 5n - 1$$

$$t_n = t_1 + d(n-1)$$

$$t_n = 4 + 5(n-1)$$

either form is OK!

RECURSIVE:

$$\begin{cases} t_1 = 4 \\ t_{n+1} = t_n + 5 \end{cases}$$

↑ Next      ↑ Now

Ex#2: Given the arithmetic sequence

$$21, \underline{27}, \underline{33}, \underline{39}, 45, \dots$$

$t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5$

$\frac{45}{-21} = \frac{24}{4} = 6$

- find the missing terms (arithmetic means)
- write 2 different equations for this sequence
- find the 25th term

$$t_n = 21 + 6(n-1)$$

$$t_n = t_1 + d(n-1)$$

$$45 = 21 + d(5-1)$$

$$\begin{cases} t_1 = 21 \end{cases}$$

$$t_{25} = 21 + 6(24)$$

$$45 = 21 + 4d$$

$$\begin{cases} t_{n+1} = t_n + 6 \end{cases}$$

$$t_{25} = 165$$

$$24 = 4d$$

$$6 = d$$

Ex#3: QUICK! Find this sum

$$1 + 2 + 3 + 4 + \dots + 38 + 39 + 40$$

$$S_n = \frac{n(t_1 + t_n)}{2}$$

↓  
"Sum of the  
1<sup>st</sup> n terms"

$$\frac{40(1 + 40)}{2}$$

$$20 \cdot 41$$

$$\textcircled{820}$$

Ex#4: QUICK! Find the sum

$$3 + 12 + 21 + \dots + 102$$

what #  
term is  
this??

$$t_n = 3 + 9(n-1)$$

$$102 = 3 + 9(n-1)$$

$$99 = 9(n-1)$$

$$11 = n-1$$

$$12 = n$$

$$S_{12} = \frac{12(3+102)}{2}$$

$$S_{12} = 6(105)$$

$$S_{12} = 630$$

12<sup>th</sup> term

$$S_n = \frac{n}{2}(t_1 + t_n)$$

Ex#5: Use sigma notation to express these sums

- Ex#3:  $1 + 2 + 3 + 4 + \dots + 38 + 39 + 40$

terms  $\left[ \begin{array}{l} \rightarrow \\ \rightarrow \end{array} \right. \sum_{n=1}^{40} \underbrace{1 + 1(n-1)}_{\text{formula}} \text{ OR } \sum_{n=1}^{40} n = 820$

- Ex#4  $3 + 12 + 21 + \dots + 102$

$\sum_{n=1}^{12} 3 + 9(n-1) = 630$  12<sup>th</sup> term

Assignment: page 670 #15, 17, 21, 27, 35, 43, 45, 49,  
57, 63, 65, 73, 75

