## 9.2 Arithmetic Sequences and Series

Friday, May 01, 2015 10:55 AM

Arithmetic Sequence

A sequence whose <u>Consecutive</u> terms have a Common difference.

 $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \ldots, \alpha_n$ is an arithmetic sequence if there is a number "d" (common difference) such that  $\alpha_2 - \alpha_1 = d$   $\alpha_3 - \alpha_2 = d$   $\alpha_4 - \alpha_3 = d$ 

8, 15, 22, ... the common difference is 7
22-15-8=7

Ex. 1 Is the sequence orithmetic? If so, why?

- a) 4,7,10,13,...13-10:3 Yes, b/c the
  10-7=3
  2-4=3 Cormon diff. is  $a_1 = \frac{3}{2}$   $a_2 = \frac{5}{2}$
- c) 1,4,9,16, ...
  No, b/c no common
  diff.

  Qn=02

Ex. 2 State the next 3 terms and the common difference.

- a) -5,7,14,... 31,43,55 d=12
- b) -12<sub>,</sub>-1, 10, .... 21,32,43 d=11
- c) 1+15,1+8,1+1,... d: -7 1-6,1-13,1-20

Ex.3

a) Show that Sn=3n+5 is an arithmetic sequence. State the First term and the common difference.

b) Show that an = 3-4n is an arithmetic sequence. State the First term and the common difference.

c) Show that an = 4(n+3) is an arithmetic sequence. State the First term and the common difference.

The nth term of an Arithmetic Sequence

an=a+(n-1)d & common difference

term looking
for

Ex. 4 Find the indicated term of the arithmetic sequence.

a) 
$$20^{45}$$
 term

2,6,10,14,...

 $a_{20} = 2 + (20-1)(4)$ 
 $a_{30} = 16 + (68-1)(-9)$ 
 $a_{30} = 78$ 
 $a_{30} = 78$ 

c) 
$$41^{37}$$
 term d) Find thre 12th term of  $11_14_1-3_1...$   $a_{12}=8+(n-1)6$   $a_{12}=8+(n-1)6$   $a_{12}=8+(n-1)6$   $a_{12}=8+(n-1)6$ 

Ex.S

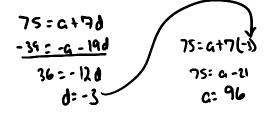
a) Find the first term of the sequence for which  $a_{ss}=197$  and d=10.

b) Find the first term of the sequence for which au = 229 and d=-8.

ex 6

a) The 8th term of an arithmetic sequence is 75; the 20th term is 39. What is the common difference and  $\alpha_1$ ?  $\alpha_1$ ?  $\alpha_2 = \alpha_1 + (n-1)d$ 

 $Q_8 = 75$   $75 = C + (8-1)A \rightarrow 75 = a + 7d$   $Q_{10} = 39$   $39 = a + (20-1)A \rightarrow 39 = a + 19d$ Sof Eq.



a: 96 and d= -3

Hw 9.2 Tb ps 635 #'s 2, 4, 10, 12, 18, 30, 36, 44,

The Sum of a Finite Arithmetic Sequence

only works for arithmetic sequences

an: arithmetic sequence (last term)

a: the first term

Ex. 7

a) Find the sum of the 
$$1^{\frac{1}{2}}$$
 63 terms of the series
$$0_{0} = -19_{1}^{-13}_{10}^{-7}_{10}, \dots$$

$$16_{10}^{-13}_{10$$

$$S_{63} = \frac{63}{2} \left( -19 + 353 \right)$$

$$S_{63} = \frac{10}{2} \left( -19 + 353 \right)$$

Ex.8

An auditorium has 30 rous of sents. There are 20 sents in the first row, 21 sents in rouz, 22 sents in rous, and so on. How many sents are there in all 30 rous?