

Find  $a$  and  $d$  in an arithmetic sequence

Pg 289 Q4

$$T_n = a + (n-1)d$$

$$T_8 = -18$$

$$a + (8-1)d = -18$$

$$\textcircled{1} a + 7d = -18$$

$$T_3 = 12$$

$$a + (3-1)d = 12$$

$$\textcircled{2} a + 2d = 12$$

Simultaneous Equation to find  $a$  and  $d$ .

$$\textcircled{1} a + 7d = -18 \quad (-1)$$

$$\textcircled{2} a + 2d = 12$$

$$\begin{array}{r} -a \\ -7d = 18 \\ a + 2d = 12 \end{array}$$

$$\begin{array}{r|l} -5 & -5d = 30 \\ & d = -6 \end{array} \quad \div -5$$

$$a = 24 \quad d = -6$$

$$d = -6 \quad \text{Find } a$$

$$\textcircled{2} a + 2d = 12$$

$$a + 2(-6) = 12$$

$$a - 12 = 12$$

$$\begin{array}{r|l} +12 & a = 24 \end{array} \quad +12$$

$$T_n = a + (n-1)d$$

$$T_n = 24 + (n-1)(-6)$$

$$T_n = 24 - 6n + 6$$

$$T_n = -6n + 30 \quad \text{Rule}$$

$$T_{100} = -6(100) + 30$$

$$= -600 + 30$$

$$T_{100} = -570$$



pg 284 Q5  $T_n = a + (n-1)d$

$$T_3 = 4$$

$$a + (3-1)d = 4$$

$$\textcircled{1} a + 2d = 4$$

$$\textcircled{1} a + 2d = 4 \quad (-1)$$

$$\textcircled{2} a + 9d = -17$$

$$\hline -a - 2d = -4$$

$$a + 9d = -17$$

$$\hline 7d = -21$$

$$d = -3$$

$$T_{10} = -17$$

$$a + (10-1)d = -17$$

$$\textcircled{2} a + 9d = -17$$

$$d = -3 \rightarrow \text{find } a$$

$$\Rightarrow \textcircled{2} a + 9d = -17$$

$$a + 9(-3) = -17$$

$$a - 27 = -17$$

$$a = 10$$

$$T_n = 10 + (n-1)(-3)$$

$$T_n = -3n + 10 + 3$$

$$T_n = -3n + 13$$

$$T_n = -47$$

$$-3n + 13 = -47$$

$$\begin{array}{l|l} -13 & -3n = -60 \\ \hline \div -3 & n = 20 \end{array}$$

CIW pg 290 Q8



Q8)  $T_4 = -9$   
 $a + (4-1)d = -9$   
 ①  $a + 3d = -9$

$$\begin{array}{r} a + 3d = -9 \quad (-1) \\ a + 14d = -31 \\ \hline -a - 3d = +9 \\ a + 14d = -31 \\ \hline 11d = -22 \\ d = -2 \end{array}$$

$T_{15} = -31$   
 $a + (15-1)d = -31$   
 ②  $a + 14d = -31$

$$\begin{array}{r} \textcircled{2} \quad a + 14(-2) = -31 \\ a - 28 = -31 \\ +28 \quad | \quad a = -3 \quad | \quad +28 \end{array}$$

$a = -3, d = -2$   
 $T_n = -3 + (n-1)(-2)$   
 $-3 - 2n + 2$   
 $T_n = -2n - 1$

$T_n = -81$   
 $-2n - 1 = -81$   
 $+1 \quad | \quad -2n = -80 \quad | \quad +1$   
 $\div -2 \quad | \quad n = 40 \quad | \quad \div -2$



## Arithmetic series.

Sequence : 1, 3, 5, 7, 9.

Replace the comma with a +

Series : 1 + 3 + 5 + 7 + 9

Add the terms

$T_n =$  sequence

$$T_n = a + (n-1)d$$

$S_n =$  Sum of the series

$$S_n = \frac{n}{2} \{ 2a + (n-1)d \}$$

$a =$  first term

$d =$  common difference.

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log  
tables.



Eg) For the arithmetic series

$$2 + 5 + 8 + \dots$$

1) Find  $a$  and  $d$   $a=2$   $d=3$

2) Find  $S_n$   $\frac{n}{2}(2a+(n-1)d)$  :  $\frac{n}{2}(2(2)+(n-1)3)$   
multiply

3) Find the sum of the first  $\frac{n}{2}(4+3n-3)$   
12 terms ( $n$ )

$$S_{12} = \frac{12}{2}(3(12)+1) \quad S_n = \frac{n}{2}(3n+1)$$

$$6(36+1)$$

$$6(37) = 222$$

$$S_{12} = 222$$

H/W

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Q2