

(15) 63, 65, 67, ...
 $a = 63, d = 65 - 63 = 2$

3, 10, 17, ...
 $a' = 3, d' = 10 - 3 = 7$

$a_n = a'_n$
 $a + (n-1)d = a' + (n-1)d'$
 $63 + (n-1)2 = 3 + (n-1)7$
 $\Rightarrow (n-1)5 = 60 \quad | \quad / 5$
 $\Rightarrow n - 1 = 12 + 1$
 $= 13$

(16) $a_3 = 16$
 $a + 2d = 16 \dots \textcircled{1}$

$a_7 - a_5 = 12$
 $a + 6d - a - 4d = 12$
 $\Rightarrow 2d = 12$
 $\Rightarrow d = 6$

Sub $\textcircled{1}$
 $a + 2 \times 6 = 16$
 $\Rightarrow a = 16 - 12$
 $\Rightarrow a = 4$

\therefore reqd A.P.
 4, 10, 16, ...

(17) given A.P.
 3, 8, 13, ..., 253

A.P. in reverse order is
 253, 248, 243, ...
 $a = 253, d = 248 - 253 = -5$

$a_{20} = a + 19d$
 $= 253 + 19(-5)$
 $= 253 - 95$
 $= 158$

20th from last = 158

(18) $a_4 + a_8 = 24$
 $a + 3d + a + 7d = 24$
 $\Rightarrow 2a + 10d = 24$
 $(\div 2) \quad a + 5d = 12 \dots \textcircled{1}$

$a_6 + a_{10} = 44$
 $a + 5d + a + 9d = 44$

$\Rightarrow 2a + 14d = 44$

$(\div 2) \quad a + 7d = 22 \dots \textcircled{2}$

$\textcircled{1} - \textcircled{2}$
 $a + 7d = 22$
 $a + 5d = 12$
 \hline

$2d = 10$

$\Rightarrow d = \frac{10}{2} = 5$

Sub $\textcircled{1}$
 $a + 25 = 12$
 $a = -13$

reqd A.P. = -13, -8, -3, ...