(13) 1st 3 digit no. divisible by 7.

$$7 \overline{)200(14}$$
$$-98$$
$$2$$

$(100 - 2 + 7) = 105$ (which = a)

last 3 digit no. divisible by 7.

$$7 \overline{)999(142}$$
$$-98\downarrow$$
$$19$$
$$-14$$
$$5$$

$\Rightarrow 999 - 5$

$= 994$ (last term)

$a_n = 994$

$a = 7$

$a(n-1)d = 994$

$105 + (n-1)7 = 994$

$(n-1)7 = 994 - 105$

$(n-1) = \frac{889}{7}$

$(n-1) = 127$

$\boxed{n = 128}$

∴ There are 128 no. divisible by 7.

(4) 1st multiple of 4 = $4\overline{)10(2}$, -8, 2

$= 10 - 2 + 4$

$= 12$

last multiple of 4 = $4\overline{)250(62}$, $-24\downarrow$, 10, -8, 2.

$= 250 - 2$

$= 248$

$a_n = 248$

$a + (n-1)d = 248$

$12 + (n-1)4 = 248$

$(n-1)4 = 248 - 12$

$(n-1) = \frac{236}{4}$

$n = 59 + 1$

$\boxed{n = 60}$

(15)

an of 1st AP	an of 2nd AP
$= a+(n-1)d$	$= 3+(n-1)7$
$= 63+(n-1)2$	$= 3+7n-7$
$= 63+2n-2$ — (i)	$= 7n-4$ — (ii)
$= 61+2n$ — (I)	

A/Q,

$= 2n+61 = 7n-4$

$= 2n-7n = -4-61$

$= -5n = -65$

$= n = \frac{-65}{-5}$

$= \boxed{n = 13}$

(16) $a_3 = 16$

$a_7 - a_5 = 12 \Rightarrow a+6d-(a-4d) = 12$.

$\Rightarrow a+6d-a+4d = 12$.

$\Rightarrow 2d = 12$.

$\Rightarrow d = \frac{12}{2}$

$\Rightarrow \boxed{d = 6}$

$\Rightarrow a_3 = 16$

$\Rightarrow a+2d = 16$.

$\Rightarrow a+2\times6 = 16$

$\Rightarrow a+12 = 16$

$\Rightarrow a = 16-12$.

$\Rightarrow \boxed{a = 4}$

$\Rightarrow a_1 = 4 \;,\; a+d = 4+6 = 10$

$\Rightarrow a_2 = a+2d = 4+2\times6 = 4+12 = 16$.

$\Rightarrow a_3 = a+3d = 4+3\times6 = 4+18 = 22$.

$\therefore$ AP: 4, 10, 16, 22.

(17) AP: 3, 8, 13, ..., 253.

As here the last term is the 1st term.

$a = 253$.

$d = -5$

$a_{20} = a + (n-1)d$

$= 253 + (20-1)-5$

$= 253 - 100 + 5$

$\boxed{a_{20} = 158}$

(18) $a_4 + a_8 = 24$

$\Rightarrow a+3d+a+7d = 24$

$\Rightarrow 2a+10d = 24$ - (1)

$a_6 + a_{10} = 44$

$a+5d+a+9d = 44$

$2a+14d = 44$ - (2)

$2a+10d = 24$

$2a+14d = 44$ (−) (−) (−)

$-4d = -20$

$d = \frac{-20}{-4}$

$\boxed{d = 5}$.

$2a+10d = 24$

$2a+50 = 24$

$2a = 24-50$

$a = \frac{-26}{2}$

$\boxed{a = -13}$

$a_1 = -13$

$a_2 = a+d = -13+5 = -8$

$a_3 = a+2d = -13+10 = -3$

$a_4 = a+3d = -13+15 = 2$

AP: $-13, -8, -3, 2$.

(19) $a = 5000$

$d = 200$

$a_n = 7000$

$\Rightarrow a+(n-1)d = 7000$

$\Rightarrow 5000+(n-1)200 = 7000$

$\Rightarrow 5000+200n-200 = 7000$

$\Rightarrow 200n = 7000-4800$

$\Rightarrow n = \frac{2200}{200}$

$\Rightarrow \boxed{n = 11}$

(20) $a = 5$

$d = 1.75$

$a_n = 20.75$

$= a+(n-1)d = 20.75$

$= 5+(n-1)1.75 = 20.75$

$= 5+1.75n-1.75 = 20.75$

$= 1.75n+3.25 = 20.75$

$= 1.75n = 17.5$

$= n = \frac{17.5}{1.75}$ or $n = \frac{175}{10} \times \frac{100}{175}$

$= n = \frac{175}{10} \times \frac{175}{18}$ $\boxed{n = 10}$

$\therefore$ In 10th week.