

Exercise 5.2

(i) $a = 7, d = 3, n = 8, a_n = ?$

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

$$\Rightarrow 7 + (8-1)3$$

$$\Rightarrow 7 + 21$$

$$\Rightarrow 28$$

$$\boxed{a_n = 28}$$

(ii) $a = -18, d = ?, n = 10, a_n = 0$

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

$$\Rightarrow -18 + (10-1)d = 0$$

$$\Rightarrow -18 + 9d = 0$$

$$\Rightarrow 9d = 18$$

$$\Rightarrow d = \frac{18}{9}$$

$$\boxed{d = 2}$$

(iii) $a = ?, d = -3, n = 18, a_n = -5$

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

$$\Rightarrow a + (18-1)(-3) = -5$$

$$\Rightarrow a + (-51) = -5$$

$$\Rightarrow a - 51 = -5$$

$$\Rightarrow a = -5 + 51$$

$$= \boxed{a = 46}$$

(iv) $a = -18.9, d = 2.5, n = ?, a_n = 3.6$

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

$$\Rightarrow -18.9 + (n-1)2.5 = 3.6$$

$$\Rightarrow -18.9 + 2.5n - 2.5 = 3.6$$

$$\Rightarrow 2.5n - 2.5 - 18.9 = 3.6$$

$$\Rightarrow 2.5n - 21.4 = 3.6$$

$$\Rightarrow 2.5n = 3.6 + 21.4$$

$$2.5n = 25.0$$

$$n = \frac{25 \times 10}{25}$$

$$\boxed{n = 10}$$

$$\begin{array}{r} 18.9 \\ + 2.5 \\ \hline 21.4 \end{array}$$

$$(v) a = 3.5, d = 0, n = 105; a_n = ?$$

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

$$3.5 + (105-1)0$$

$$3.5 + 0$$

$$3.5$$

$$\boxed{a_n = 3.5}$$

(2)

(i) 30th term of the AP: 10, 7, 4, ... is

$$a_1 = 10$$

$$n = 30$$

$$d = 7 - 10$$

$$\boxed{d = -3}$$

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

$$\Rightarrow 10 + (30-1)(-3)$$

$$\Rightarrow 10 + (-87)$$

$$\Rightarrow -77$$

$$\boxed{(C) -77}$$

(ii) 11th term of the AP: $-3, -\frac{1}{2}, 2, \dots$ is.

$$a_1 = -3$$

$$n = 11$$

$$d = -\frac{1}{2} - (-3) = -\frac{1}{2} + 3 = \frac{-1 + 6}{2} = \frac{5}{2}$$

$$\boxed{d = \frac{5}{2}}$$

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

$$\Rightarrow -3 + (11-1)\frac{5}{2}$$

$$\Rightarrow -3 + 10 \times \frac{5}{2}$$

$$\Rightarrow -3 + 25$$

$$\Rightarrow 22$$

$$\boxed{B = 22}$$

(3)

(i)

2, $\boxed{14}$, 26.

Let the a_2 term be n .

$$\Rightarrow n - 2 = 26 - n.$$

$$\Rightarrow n + n = 26 + 2.$$

$$\Rightarrow 2n = 28$$

$$\Rightarrow n = \frac{28}{2}$$

$$\Rightarrow \boxed{n = 14}$$

(ii)

$\boxed{18}$, 13, $\boxed{8}$, 3.

$$a_2 = 13$$

$$a + d = 13 \quad \text{--- (i)}$$

$$a_4 = 3$$

$$a + 3d = 3 \quad \text{--- (ii)}$$

$$a + d - a - 3d = 13 - 3$$

$$-2d = 10$$

$$d = \frac{10}{-2}$$

$$\boxed{d = -5}$$

$$a = 13 - (5)$$

$$= 13 + 5$$

$$\boxed{a_1 = 18}$$

$$a_3 = 3 - (-5)$$

$$= 3 + 5$$

$$\boxed{a_3 = 8}$$

(iii) $5, \boxed{13/2}, \boxed{8}, a_4$
 $\Rightarrow a_1 = 5$ | $a + 3d = 19$
 $\Rightarrow a = 5$

$\Rightarrow 5 + 3d = \frac{19}{2}$	$a + d = a_2$
$\Rightarrow 3d = \frac{19 - 5}{2}$	$\Rightarrow 5 + \frac{3}{2}$
$\Rightarrow 3d = \frac{19 - 10}{2}$	$\Rightarrow \frac{10 + 3}{2}$
$\Rightarrow 3d = \frac{9}{2}$	$\Rightarrow \boxed{a_2 = \frac{13}{2}}$
$\Rightarrow d = \frac{9}{2} \times \frac{1}{3}$	$a + 2d = a_3$
$\Rightarrow \boxed{d = \frac{3}{2}}$	$5 + 2 \times \frac{3}{2}$
	$5 + 3$
	$\Rightarrow \boxed{a_3 = 8}$

(iv) $-4, \boxed{-2}, \boxed{0}, \boxed{2}, \boxed{4}, 6$
 $\Rightarrow a_1 = -4$ | $a_6 = 6$
 $a = -4$ | $a + 5d = 6$

$\Rightarrow a + 5d = 6$	$\Rightarrow a + 2d$
$\Rightarrow -4 + 5d = 6$	$\Rightarrow -4 + 2 \times 2 \Rightarrow -4 + 4$
$\Rightarrow 5d = 6 + 4$	$\Rightarrow \boxed{a_3 = 0}$
$\Rightarrow d = \frac{10}{5}$	$\Rightarrow a + 3d \Rightarrow -4 + 3 \times 2$
$\Rightarrow \boxed{d = 2}$	$\Rightarrow -4 + 6$
$\Rightarrow a + d$	$\Rightarrow \boxed{a_4 = 2}$
$\Rightarrow -4 + 2$	$\Rightarrow a + 4d \Rightarrow -4 + 4 \times 2$
$\Rightarrow \boxed{a_2 = -2}$	$\Rightarrow -4 + 8$
	$\Rightarrow \boxed{a_5 = 4}$

(v) $\boxed{53}, 38, \boxed{23}, \boxed{8}, \boxed{-7}, -22$

$\Rightarrow a_2 = 38$ | $a_6 = -22$
 $a + d = 38$ - (i) | $a + 5d = -22$ - (ii)

$\Rightarrow a + d = 38$ - (i)
 $\Rightarrow a + 5d = -22$ - (ii)

$\Rightarrow a + d - a - 5d = 38 - (-22)$

$-4d = 38 + 22$
 $-4d = 60$
 $d = \frac{-60}{4}$

$\boxed{d = -15}$

$a + d = 38$
 $a + (-15) = 38$
 $a = 38 + 15$
 $\boxed{a_1 = 53}$

$a + 2d = 53 + 2(-15)$
 $= 53 - 30$
 $\boxed{a_3 = 23}$

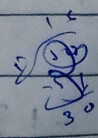
$a + 3d \Rightarrow 53 + 3(-15)$
 $\Rightarrow 53 + (-45)$
 $\Rightarrow 53 - 45$
 $\boxed{a_4 = 8}$

$a + 4d$
 $\Rightarrow 53 + 4(-15)$
 $\Rightarrow 53 + (-60)$
 $\Rightarrow 53 - 60$
 $\Rightarrow -7$
 $\Rightarrow \boxed{a_5 = -7}$

(4) AP: $3, 8, 13, 18, \dots$
 ~~$a_3 = 13$~~ $d = 8 - 3$
 $\boxed{d = 5}$

$a_n = a + (n-1)d$
 $78 = 3 + (n-1)5$
 $78 = 3 + 5n - 5$
 $5n - 2 = 78$
 $5n = 80$
 $\boxed{n = 16}$

$\therefore 16^{\text{th}}$ term.



(5)

(i) $7, 13, 19, \dots, 205$

$\Rightarrow d = 13 - 7$

$d = 6$

$\Rightarrow a + (n-1)d = 205$

$\Rightarrow 7 + (n-1)6 = 205$

$\Rightarrow 7 + 6n - 6 = 205$

$\Rightarrow 6n + 1 = 205$

$\Rightarrow 6n = 205 - 1$

$\Rightarrow n = \frac{204}{6} = 34$

$\therefore n = 34$ $\therefore 34$ terms.

(ii) $18, 15\frac{1}{2}, 13, \dots, -47$

$\Rightarrow d = 15\frac{1}{2} - 18$

$= \frac{31}{2} - 18$

$= \frac{31 - 36}{2}$

$d = \frac{-5}{2}$

$\Rightarrow a + (n-1)d = -47$

$\Rightarrow 18 + (n-1)\frac{-5}{2} = -47$

$\Rightarrow 18 + \frac{-5n}{2} + \frac{5}{2} = -47$

$\Rightarrow \frac{-5n}{2} = -47 - 18 - \frac{5}{2}$

$\Rightarrow \frac{-5n}{2} = \frac{-94 - 36 - 5}{2}$

$\Rightarrow n = \frac{-135}{-5} \times \frac{2}{2}$

$\therefore n = 27$ $\therefore 27$ terms.