1) i) 27, 29, 31, 33, ...

AP $a = 27$, $d = 2$

$7^{th}$ term $= a + 6d = 27 + 6 \times 2 = 39$

ii) 1, 2, 3, 5, 8 Not a AP

iii) 2, 4, 8, 16 Not a AP

iv) 3, 7, 11, 15, ....

AP $a = 3$, $d = 4$

$7^{th}$ term $= a + 6d$ $3 + 6 \times 4 = 27$

v) 8, 6, 4, 2, ....

AP $a = 8$, $d = -2$

$7^{th}$ term $= a + 6d$

$= 8 + 6(-2)$

$= -4$

2) i) AP $a = -8$, $d = 3$

$7^{th}$ term $= a + 6d$

$= -8 + 6 \times 3 = 10$

ii) If n terms

$n^{th}$ term $= a + (n-1)d = 100$

$-8 + (n-1)3 = 100$

$3(n-1) = 108$

$n - 1 = 36 \Rightarrow n = 37$

3) AP $a = 12$, $a + 6d = 36$

$n^{th}$ term $= 144$

i) $6d = 36 - 12 = 24$

$\Rightarrow d = 4$

ii) $a + (n-1)d = 144$

$12 + 4(n-1) = 144$

$4(n-1) = 132$

$n - 1 = 33$

$\Rightarrow n = 34$

4) AP $a = -5$

$a + 19d = 90$

i) $19d = 90 - -5 = 95$

$\Rightarrow d = 5$

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

$S_{20} = \frac{20}{2}(-10 + 19 \times 5)$

$= 850$

5) AP $a_n = 14 + 2n$

$a_1 = 16$, $a_2 = 18$, $a_3 = 20$

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

$S_{12} = \frac{12}{2}(2\times 16 + 11\times 2)$

$= 6(54) \quad = 324$

6)

AP 120, 114, .... 36

i)

$a = 120, \quad d = -6$

Let last term be $n^{th}$ term

$a + (n-1)d = 36$

$120 + (n-1)(-6) = 36$

$(n-1)(-6) = 36 - 120$

$(n-1)(-6) = -84$

$(n-1) = \frac{-84}{-6} = 14$

$\Rightarrow n = 15$

6 ii)

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

$S_{15} = \frac{15}{2}(240 + 14\times(-6))$

$= \frac{15}{2}(156)$

$= 1170$

7) AP $a + 4d = 28$

$a + 9d = 58$

i)

$\Rightarrow \quad 5d = 30$

$\Rightarrow \quad d = 6$

$a + 24 = 28$

$\Rightarrow a = 4$

$\therefore a = 4, \quad d = 6$

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

$444 = \frac{n}{2}(8 + 6(n-1))$

$888 = n(8 + 6n - 6)$

$888 = n(2 + 6n)$

$888 = 6n^2 + 2n$

$3n^2 + n - 444 = 0$

$n = \frac{-1 \pm \sqrt{1 + 5328}}{6}$

$n = \frac{-1 \pm 73}{6}$

$n = 12$ or $n = -12\frac{1}{3}$

$n = 12$

8) AP $a + 5d = 2(a + 2d)$

Given $a = 3$

8 cont) $3 + 5d = 2(3 + 2d)$

$3 + 5d = 6 + 4d$

$d = 3$

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

$S_{10} = \frac{10}{2}(6 + 9 \times 3)$

$= 165$

9)

AP 1, 3, 5, 7, ....

i)

12th term $= a + 11d$

$= 1 + 11 \times 2 = 23p$

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

$S_{12} = \frac{12}{2}(2 + 11 \times 2)$

$= 144p \quad = £1.44$

10)

AP 51, 53, 55, ..... 149

$a = 51, \quad d = 2$

50 odd numbers from 51 to 149

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

$S_{50} = \frac{50}{2}(102 + 49 \times 2)$

$= 5000$

ii) $a = 50, \quad d = 2$

51 even numbers from 50 to 150

$S_{51} = \frac{51}{2}(100 + 50 \times 2)$

$= 5100$

iii)

AP $a = 50, \quad d = 1$

$S_{101} = \frac{101}{2}(100 + 100)$

$= 10100$

iv)

iii) Adds all integers from 50 to 150

i) Adds all odds

ii) Adds all evens

$\therefore$ i) + ii) = iii)

$5000 + 5100 = 10100$