Q1) $a_n = -4n + 15$

Putting $n = 1, 2, 3, 4$

$a_1 = -4 \times 1 + 15 = 11$

$a_2 = -4 \times 2 + 15 = 7$

$a_3 = -4 \times 3 + 15 = 3$

$a_4 = -4 \times 4 + 15 = -1$

$a_2 - a_1 = -4$

$a_3 - a_2 = -4$

$a_4 - a_3 = -4$

So the given sequence is in AP with common difference $d = -4$.

Q2) n^{th} term $= 6n + 11$

$a_1 = 6 \times 1 + 11 = 17$

$a_2 = 6 \times 2 + 11 = 23$

$a_3 = 6 \times 3 + 11 = 29$

$d = a_2 - a_1 = 23 - 17 = 6$

Q3) $AP_1 = 9, 7, 5$ $AP_2 = 15, 12, 9$

n^{th} term $= a + (n-1)d$
$= 9 + (n-1) - 2$
$= 9 - 2n + 2$
$\Rightarrow 11 - 2n$

n^{th} term $= a + (n-1)d$
$= 15 + (n-1) - 3$
$= 15 - 3n + 3$
$= 18 - 3n$

$11 - 2n = 18 - 3n$
$\Rightarrow 3n - 2n = 18 - 11$
$n = 7$

4) $a_8 = 31$

$a_{15} = a_{11} + 16$

$a + 14d = a + 10d + 16$

$4d = 16$

$d = 4$

$a_8 = a + 7d$

$31 = a + 7 \times 4$

$a = 31 - 28 = 3$

3, 7, 11, 15 . . . .

Q8) 1, 3.5, 6, 8.5

$a = 1 \quad d = 2.5$

$a_{10} = a + 9d$

$1 + 9 \times 2.5$

$= 23.5$

16) 1, 2, 3 10

$a = 1 \quad d = 1 \quad , \quad a_{10} = 10$

$S_{10} = \frac{n}{2}\left(2a + (n-1)d\right)$

$= \frac{10}{2}\left(2\times 1 + (9)\times 1\right)$

$= 5 \times 11 = 55$