

5. Anna saves money each week to buy a printer which costs €190. Her plan is to start with €10 and to put aside €2 more each week (i.e. €12, €14, etc.) until she has enough money to buy the printer.
At this rate, how many weeks will it take Anna to save for the printer?

Arithmetic Series

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

$S_n = 190$
 $n = ?$
 $a = 10$
 $d = 2$

$a = 5$
 $b = -3$
 $c = -190$

Week	1	2	3	4	Total
€.	10	+12	+14	+16+...	= 190

$d = 2$
 $a = 10$

$$S_n = \frac{n}{2} [2(10) + (n-1)2] = 190$$

$$\Rightarrow n [20 + 2n - 2] = 380$$

$$2n^2 + 18n - 380 = 0$$

$$n^2 + 9n - 190 = 0$$

$$(n - 10)(n + 19)$$

$$\Rightarrow n = 10 \checkmark \text{ or } n = -19 \text{ X nonsense}$$

ANSWER: 10 weeks

6. Evaluate (i) $\sum_{r=1}^6 (3r + 1)$ (ii) $\sum_{r=0}^5 (4r - 1)$ (iii) $\sum_{r=1}^{100} r$

$T_n = 3n + 1$ (i) $T_1 \Rightarrow r=1 \Rightarrow T_1 = 3(1) + 1 = 4 = a$

$n = 6$
(1 to 6)

$T_2 \Rightarrow r=2 \Rightarrow T_2 = 3(2) + 1 = 7$
 $T_3 \Rightarrow r=3 \Rightarrow T_3 = 3(3) + 1 = 10$

$+3 = d$

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

$$S_6 = \frac{6}{2} [2(4) + (6-1)3]$$

$$S_6 = 3 [8 + 15] = 3 [23] = 69$$

$T_n = 4n - 1$ (ii)

How many terms?
(0 to 5)
 $n = 6$

$T_1 \Rightarrow r=0 \Rightarrow T_1 = 4(0) - 1 = -1$
 $T_2 \Rightarrow r=1 \Rightarrow T_2 = 4(1) - 1 = 3$
 $T_3 \Rightarrow r=2 \Rightarrow T_3 = 4(2) - 1 = 7$

$a = -1$ $d = 4$

$$S_6 = \frac{6}{2} [2(-1) + (6-1)4] = 54$$