



## SEQUENCES AND ALGEBRA TEST

### 3° ESO



**Exercise 1: (1.5 points)** Find the general term in the following series:

- a)  $\{7, 21, 63, 189, 567 \dots\}$   
b)  $\{30, 23, 16, 9, 2 \dots\}$   
c)  $\left\{2, \frac{3}{4}, \frac{4}{9}, \frac{5}{16}, \frac{6}{25}, \dots\right\}$

**Exercise 2: (1 point)** In an arithmetic progression we know that  $a_{12} = 512$  and the first term is 15. Find the general term and the sum of the first one hundred terms.

**Exercise 3: (1 point)** In a geometric progression we know that  $a_7 = 576$  and  $a_{13} = 36864$ . Find the general term and the sum of the first thirty-seven terms.

**Exercise 4: (0.75 points)** How many terms are there in the sequence  $\{5, 11, 17, 23, 29, \dots, 491\}$

**Exercise 5: (0.75 points)** 15 years ago half a kilo of coffee (yes, I am obsessed) cost 3€ but it has increased an average of 5% per year since then. What's the price nowadays?

**Exercise 6: (1.25 points)** Given the polynomials:

$$P(x) = 5x^3 - 6x^2 + 9 \qquad Q(x) = -x^3 + x - 7 \qquad R(x) = 2x - 5$$

Work out the value of  $P - Q$  and  $P \cdot R$

**Exercise 7: (2 points)**

a) Expand these expressions using quadratic multiplication formulas:

$$\text{a1) } (7x + 5y)^2 = \qquad \text{a2) } (3w^5 - 2) \cdot (3w^5 + 2) = \qquad \text{a3) } (x^6 - 9x^3)^2 =$$

b) Take out common factors:

$$14x^5y^3 - 21x^4y^2 + 35x^3y - 5x^2y =$$

**Exercise 8: (1.75 points)** Solve the following equations:

$$\text{a) } x - \frac{5x - 7}{6} = \frac{1}{2} - \frac{9 - 3x}{4}$$

$$\text{b) } \frac{13x - 5}{2x + 7} = \frac{9}{4}$$

