

### SEQUENCES AND POLYNOMIALS TEST – 3º ESO

**Exercise 1: (1.5 ptos)** Find the general term of the following sequences:

- a)  $\{9, 36, 144, 576, 2304 \dots\}$        $a_n = 9 \cdot 4^{n-1}$   
b)  $\left\{\frac{3}{1}, \frac{4}{4}, \frac{5}{9}, \frac{6}{16}, \frac{7}{25} \dots\right\}$        $a_n = \frac{n+2}{n^2}$   
c)  $\{-5, -1, 3, 7, 11, 15 \dots\}$        $a_n = -5 + 4(n-1)$

**Exercise 2: (1 pto)** In an AP we know that  $a_{12} = 48$  and  $a_{30} = 102$ . Find the general term,  $a_{75}$  and the sum of the first one hundred terms       $a_n = 15 + 3(n-1)$        $a_{75} = 237$        $S_{100} = 16350$

**Exercise 3: (0.75 ptos)** In a GP we know that  $a_1 = 9$  and  $a_9 = 2304$ . Find the general term and the sum of the first seventy terms       $a_n = 9 \cdot 2^{n-1}$        $S_{70} = 1.06 \cdot 10^{22}$

**Exercise 4: (1 pto)** I place 2000€ in the bank at the beginning of each year with an interest rate of 2% per year. How much money will I have 10 years later?       $S_{10} = 21899.44\text{€}$

**Exercise 5: (1 pto)** A company has a profit of 1200€ during the first year, 1500€ the second year, 1800€ the third year and so on. What's the profit in the tenth year? How much money will they earn in total?

$$a_{10} = 3900\text{€} \quad S_{10} = 25500\text{€}$$

**Exercise 6: (1.25 ptos)** Work out:

- a)  $(3x-5)(3x+5) = 9x^2 - 25$   
b)  $(7x^6 - 4x^2)^2 = 49x^{12} - 56x^8 + 16x^4$   
c)  $(v+w)^4 = v^4 + 4v^3w + 6v^2w^2 + 4vw^3 + w^4$

**Exercise 7: (0.75 ptos)** Evaluate the polynomial  $P(x) = 5x^3 - 4x^2 - 8x + 9$  when  $x = -2$        $P(-2) = -31$

**Exercise 8: (1.5 ptos)** Take out common factors and group together if possible:

- a)  $12x^5 - 15x^4 + 21x^3 - 3x^2 = 3x^2(4x^3 - 5x^2 + 7x - 1)$   
b)  $(x-2)^3 + 5(x-2)^2 - 3(x-2) = (x-2)(x^2 + x - 9)$

**Exercise 9: (1.25 ptos)** Given the polynomials  $P(x) = 4x^3 - 3x^2 - 5x + 7$ ,  $Q(x) = -x^3 + 7x^2 - 5x - 2$  and  $R(x) = 3x^2 - x$ , work out:

- a)  $P - Q = 5x^3 - 10x^2 + 9$   
b)  $P \cdot R = 12x^5 - 13x^4 - 12x^3 + 26x^2 - 7x$

