SEQUENCES AND POLYNOMIALS TEST

3º ESO

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

a) $\{2, 14, 98, 686, 4802\cdots\} \rightarrow a_n = 2\cdot 7^{n-1}$

b) $\left\{0, \frac{3}{4}, \frac{8}{5}, \frac{15}{6}, \frac{24}{7}, \frac{35}{8}\cdots\right\} \rightarrow a_n = \frac{n^2-1}{n+2}$

c) $\{-2, 2, 6, 10, 14, 18\cdots\} \rightarrow a_n = -2+4(n-1)$

Exercise 2: (1 pto) In an AP we know that $d=3$ and $a_{29}=89$. Find the general term, and the sum of the first 75 terms $a_n = 5+3(n-1)$ $S_{75} = 8700$

Exercise 3: (1 pto) In a GP we know that $a_3 = 20$ and $a_{12} = 10240$. Find the general term and the sum of the first 30 terms $a_n = 5\cdot 2^{n-1}$ $S_{30} = 5368709115$

Exercise 4: (0.75 ptos) There were a total of 2000 ponds in Doñana's Natural Park, but due to climate change during the past decades they have been decreasing by an average of 1.05% per year. How many ponds are there 80 years later? 869 ponds, more or less

Exercise 5: (1.25 ptos) How many terms are there in the sequence $\{7, 11, 15, 19, 23, \cdots, 71\}$ $n = 17$

Exercise 6: (1.5 ptos) Work out using quadratic multiplication formulas:

a) $(2x-7)(2x+7) = 4x^2 - 49$

b) $\left(3x^5 - 2x^3\right)^2 = 9x^{10} - 12x^8 + 4x^6$

c) $(5x+3y)^2 = 25x^2 + 30xy + 9y^2$

Exercise 7: (0.75 ptos) Evaluate the polynomial $P(x) = 7x^3 - 5x^2 - 9x + 1$ when $x = -2$

$P(-2) = -57$

Exercise 8: (1 pto) Take out common factors and group together if possible:

a) $20x^5 - 15x^4 + 10x^3 - 5x^2 = 5x^2\left(4x^3 - 3x^2 + 2x - 1\right)$

b) $a^5b^2c^3 + a^3b^6c^4 + a^4b^5c^7 = a^3b^2c^3\left(a^2 + b^4c + ab^3c^4\right)$

Exercise 9: (1.25 ptos) Given the polynomials $P(x)=5x^3-2x^2-6x+4$, $Q(x)=-x^3+8x^2-4x-3$ and $R(x)=x^2-2x$, work out:

a) $P-Q=6x^3-10x^2-2x+7$

b) $P\cdot R=5x^5-12x^4-2x^3+16x^2-8x$