

## SEQUENCES AND POLYNOMIALS TEST – 3º ESO

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

a)  $\{25, 21, 17, 13, 9, \dots\} \rightarrow a_n = 25 - 4(n-1)$

b)  $\left\{\frac{-1}{5}, 0, \frac{1}{15}, \frac{2}{20}, \frac{3}{25}, \frac{4}{30}, \dots\right\} \rightarrow a_n = \frac{n-2}{5n}$

c)  $\{80, 40, 20, 10, 5, \dots\} \rightarrow a_n = 80 \cdot \left(\frac{1}{2}\right)^{n-1}$

**Exercise 2: (1 point)** In an arithmetic sequence we know that  $d = 4$  and  $a_{20} = 83$ . Find the general term and the sum of the first seventy-five terms  $a_n = 7 + 4(n-1)$   $S_{75} = 11625$

**Exercise 3: (1 point)** In a GP we know that  $a_4 = 135$  and  $a_{12} = 885\,735$ . Find the general term and the sum of the first thirty terms  $a_n = 5 \cdot 3^{n-1}$   $S_{75} = 5 \cdot 15 \cdot 10^{14}$

**Exercise 4: (0.75 points)** A bakery produced fifty pieces of bread each day, but the business is blooming and now each day they have to bake five more pieces than the day before. If today they placed one hundred and ten "breads-to-be" into the oven, how long it's been since the production started rising?

13 days

**Exercise 5: (1 point)**

a) The government has promised to increase our salary by 2% every year. If I am earning 1750€ a month now, how much would I get a month in 2035? 2309.09€

b) It is thought that the coronavirus of Wuhan expands following a geometric progression with initial term one (the first infected person in the market) and ratio  $r = 1.21$ , daily. How many people are expected to be sick forty-five days after the epidemic started? 25295 people

PS: 9200 people die every month in the world because of measles. 110 000 people every year

**Exercise 6: (1.75 points)** Work out:

a)  $(3x - 2y)^2 = 9x^2 - 12xy + 4y^2$

b)  $\left(\frac{3}{5}x^4 + \frac{5}{2}x^3\right)^2 = \frac{9}{25}x^8 + 3x^7 + \frac{25}{4}x^6$

c)  $(4a^3b^5 - ab)(4a^3b^5 + ab) = 16a^6b^{10} - a^2b^2$

d)  $(5x^3 - 7x^2 + 3x) \cdot (2x^2 - x) = 10x^5 - 19x^4 + 13x^3 - 3x^2$

**Exercise 7: (1.5 points)** Factor out these expressions taking out common factors and using quadratic multiplication formulas:

a)  $12x^3 - 60x^2 + 75x = 3x(2x - 5)^2$

b)  $2u^{11}v - 18uvw^4 = 2uv(u^5 + 3w^2)(u^5 - 3w^2)$



**Exercise 8: (1 point)** Evaluate the polynomial  $P(x) = 7x^3 + 6x^2 - 5x$  when:

a)  $x = 3$                        $P(3) = 228$

b)  $x = -1$                        $P(-1) = 4$

**Exercise 9: (0.5 points)** Solve the equation  $x^3(2x+5)(x-1)^2(x+2) = 0$

$x = 0$  triple,       $x = -5/2$ ,       $x = 1$  double,       $x = -2$

