POLYNOMIALS AND EQUATIONS TEST – 3º ESO

Exercise 1: (1 point) Evaluate the polynomial $P(x) = 4x^3 - 3x^2 - 5x + 2$ when:

a) $x = 2 \rightarrow P(2) = 12$

b) $x = -1 \rightarrow P(-1) = 0$

Exercise 2: (2 points) Expand using quadratic multiplication formulas:

a) $(5x-1)^2 = 25x^2 - 10x + 1$

b) $(2v+3w)^2 = 4v^2 + 12vw + 9w^2$

c) $(7a-3)(7a+3) = 49a^2 - 9$

d) $(2x^5 - x^3)^2 = 4x^{10} - 4x^8 + x^6$

Exercise 3: (1.5 points) Solve the following second degree equations without using the formula:

a) $28x^2 - 7 = 0 \rightarrow \boxed{x = \pm 1/2}$

b) $25x^2 - 9 = 0 \rightarrow \boxed{x = \pm 3/5}$

c) $8x^2 + 6x = 0 \rightarrow \boxed{x = 0} \quad \boxed{x = -3/4}$

Exercise 4: (2 points) Solve the following second degree equations:

a) $x^2 - 9x + 8 = 0 \rightarrow \boxed{x = 1} \quad \boxed{x = 8}$

b) $x^2 - 4x + 4 = 0 \rightarrow \boxed{x = 2 \text{ double}}$

c) $6x^2 - 11x - 10 = 0 \rightarrow \boxed{x = 5/2} \quad \boxed{x = -2/3}$

d) $x^2 + 4x = 5x + 6 \rightarrow \boxed{x = 3} \quad \boxed{x = -2}$

Exercise 5: (1 point) Find the dimensions of a triangle if the base is 7 cm longer than the altitude and its area measures $85\ \text{cm}^2$ The base is 17 cm long and the altitude measures 10 cm

Exercise 6: (1 point) Solve the equation $\dfrac{(x-2)^2}{4} = x + 1 \rightarrow \boxed{x = 0} \quad \boxed{x = 8}$

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

a) $2x^4 - 28x^3 + 98x^2 = 2x^2(x-7)^2$

b) $a^3b - 9ab^3 = ab(a-3b)(a+3b)$