REAL NUMBERS AND POLYNOMIALS

TEST - 4º ESO

Exercise 1: (1 point) The La Palma volcano expels 2710 tons of sulfur dioxide every day. Knowing that the eruption has been going on for 39 days:

a) How many kilos of sulfur dioxide have been thrown to the atmosphere? Use scientific notation

$1.06 \cdot 10^8$ kg

b) Find the percentage error if I approximate the total expelled amount of sulfur dioxide to one hundred thousand tons $E_p = 5.38\%$

Exercise 2: (1.5 points)

a) Find the value ok k so that when dividing $P(x) = x^3 - kx^2 + 19x - 10$ by $(x-3)$ the remainder is -7 $k = 9$

b) Divide $(x^4 - 3x^2 + 5x - 2) : (x^2 - 3x)$

Quotient : $x^2 + 3x + 6$

Remainder : $23x - 2$

Exercise 3: (3 points) Factorize these polynomials and indicate their roots:

a) $P(x) = x^5 - x^4 - 26x^3 + 26x^2 + 25x - 25$

Roots : $x = 1$ double, $x = -1$, $x = \pm 5$

Factorization : $(x-1)^2 (x+1)(x+5)(x-5)$

b) $P(x) = x^4 + 6x^3 + 14x^2 + 54x + 45$

Roots : $x = -1$, $x = -5$

Factorization : $(x+1)(x+5)(x^2+9)$

c) $P(x) = x^5 + x^4 - 4x^3 - 4x^2$

Roots : $x = 0$ double, $x = -1$, $x = \pm 2$

Factorization : $x^2 (x+1)(x+2)(x-2)$

Exercise 4: (1.25 points) Rationalize the following expressions:

a) $\dfrac{14}{\sqrt[5]{7^3}} = 2\sqrt[5]{7^2}$

b) $\dfrac{15}{\sqrt{3}} = 5\sqrt{3}$

c) $\dfrac{3+\sqrt{7}}{3-\sqrt{7}} = 8 + 3\sqrt{7}$

Exercise 5: (1 point) Study the following unions and intersections of intervals and **write them as inequalities** too:

a) $(-6,-2]\cup[-4,0)=(-6,0) \;\rightarrow\; -6<x<0$

b) $[-1,3]\cap[3,7)=\{3\} \;\rightarrow\; x=3$

Exercise 6: (2.25 points) Work out, express as a single radical and simplify if possible:

a) $\sqrt[7]{x^2}:\sqrt{x^{-1}}\cdot\sqrt[5]{x^{-10}}=\frac{1}{x}\cdot\sqrt[14]{\frac{1}{x^3}}$ (0.5)

b) $4\sqrt{75}+5\sqrt{243}-2\sqrt{48}=57\sqrt{3}$ (0.75)

c) $\frac{\sqrt[5]{a^{-4}}\cdot\sqrt[7]{b^{-5}}}{\sqrt{b\cdot a^{-2}}}=\frac{1}{b}\cdot\sqrt[70]{\frac{a^{14}}{b^{15}}}$ (1)