REAL NUMBERS, POLYNOMIALS AND FRACTIONS TEST - 4º ESO

Exercise 1: **(0.5 points)** Find the value of k so that when dividing the polynomial $P(x) = kx^3 - x^2 + 3x - 2$ by $(x+2)$ the remainder is 17 $\boxed{k = -29/8}$

Exercise 2: (1 point) Solve and factorize the equation $P(x) = x^5 + 10x^4 + 33x^3 + 44x^2 + 20x$

Roots: $x = 0$, $x = -1$, $x = -2$ double, $x = -5$

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

Exercise 3: (1.25 points) Rationalize the following expressions:

a) $\dfrac{10}{\sqrt{5}} = 2\sqrt{5}$

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

c) $\dfrac{5+\sqrt{7}}{5-\sqrt{7}} = \dfrac{16+5\sqrt{7}}{9}$

Exercise 4: (3.25 points) Work out the value of the following expressions and simplify if possible:

a) $\dfrac{x^2-16}{x^2+2x+1} \cdot \dfrac{x^2-1}{x^2-5x+4} = \dfrac{x+4}{x+1}$ (1)

b) $\dfrac{5x^2-10x}{10x^2-90} : \dfrac{x^2+x-6}{x^2+6x+9} = \dfrac{x}{2x-6}$ (1)

c) $\dfrac{x^4-13x^2+36}{x^3+x^2-6x} = \dfrac{x^2-x-6}{x}$ (1.25)

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

a) $(-3,7] \cup [1,4) = (-3,7] \rightarrow -3 < x \leq 7$

b) $(-\infty,0] \cap [0,1] = \{0\} \rightarrow x = 0$

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

a) $5 \cdot \sqrt[3]{192} + \sqrt[3]{648} - 2 \cdot \sqrt[3]{1029} = 12\sqrt[3]{3}$ (0.75)

b) $\dfrac{\sqrt{3 \cdot 5^{-4}} \cdot \sqrt[3]{3^{-2}}}{\sqrt[5]{5^3}} = \dfrac{1}{5^2} \cdot \sqrt[30]{\dfrac{1}{3^5 \cdot 5^{18}}}$ (1)

c) $\sqrt[3]{y^{-7}} \cdot \sqrt{y^3} : \sqrt[5]{y^{-1}} = \sqrt[30]{\dfrac{1}{y^{19}}}$ (0.5)

Exercise 7: (0.75 points) A certain company promises that they will give you the money back if an order arrives a 15% later than the estimated delivery time. I ordered a book and they told me that it would take it three weeks to come home to me, but it actually needed 24 days. Am I getting my money back? Find the percentage error to explain your answer.

Nope, I am not getting my money back, since the difference was "only" 14.28%. I am sad. I hope that I will like the book at least.