REAL NUMBERS, POWERS AND ROOTS TEST

3º ESO

Exercise 1: **(1 point)** I've bought a quarter of a kilo of pumpkin coffee for Halloween but when I got home and I weighed the package, the result was of 247 gr . Find the absolute, relative and percentage errors and tell me if I should go back to the store and ask them to return my money.

$E_a = 3$ gr, $\quad E_r = 0.012, \quad E_p = 1.2\%$

But, as you can guess, I am not complaining just because of 3 gr of coffee. It could be that my scale is not precise enough and I will make a fool of myself :(

Exercise 2: **(2 points)** Study the following unions and intersections of intervals. Express them as **inequalities** too:

a) $(-3,7) \cup [4,9] = (-3,9] \rightarrow -3 < x \leq 9$

b) $[-3,1) \cup (1,5] = [-3,1) \cup (1,5]$

c) $(-\infty,-3] \cap (-5,8] = (-5,-3] \rightarrow -5 < x \leq -3$

d) $[-3,0] \cap [0,+\infty) = \{0\} \rightarrow x = 0$

e) $(-\infty,1] \cap (2,+\infty) = \varnothing$

Exercise 3: **(4.5 points)** Work out, express as a single radical and simplify if possible:

a) $\sqrt[6]{x^{-5}} : \sqrt[4]{x^{-3}} = \sqrt[12]{\dfrac{1}{x}}$ $\hspace{2cm}$ (0.75)

b) $\dfrac{\sqrt{t^{-1}} \cdot \sqrt[3]{t^{-7}}}{\sqrt[5]{t^2}} = \dfrac{1}{t^3} \cdot \sqrt[30]{\dfrac{1}{t^7}}$ $\hspace{2cm}$ (1)

c) $\dfrac{\sqrt[3]{a^{-2} \cdot b^5} \cdot \sqrt{a}}{\sqrt[5]{a^2 \cdot b^{-3}}} = b^2 \cdot \sqrt[30]{\dfrac{b^8}{a^{17}}}$ $\hspace{2cm}$ (1.25)

d) $5\sqrt{448} - \sqrt{405} - 2\sqrt{500} - \sqrt{7} = 39\sqrt{7} - 29\sqrt{5}$ $\hspace{2cm}$ (1.5)

Exercise 4: **(2.5 points)** Work out and simplify if possible:

a) $\sqrt[3]{373248} = 72$ $\hspace{2cm}$ (0.75)

b) $\sqrt[5]{\dfrac{a^{10}}{v^{-30} e^{-45}}} = e^9 v^6 a^2$ $\hspace{2cm}$ (0.75)

c) $\sqrt[5]{\dfrac{x^{29} y^{-102} z^{40}}{w^{-32}}} = \dfrac{x^5 z^8 w^6}{y^{20}} \cdot \sqrt[5]{\dfrac{x^4 w^2}{y^2}}$ $\hspace{2cm}$ (1)