



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.

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

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:

- $(-3, 7) \cup [4, 9] = (-3, 9] \rightarrow -3 < x \leq 9$
- $[-3, 1) \cup (1, 5] = [-3, 1) \cup (1, 5]$
- $(-\infty, -3] \cap (-5, 8] = (-5, -3] \rightarrow -5 \leq x < -3$
- $[-3, 0] \cap [0, +\infty) = \{0\} \rightarrow x = 0$
- $(-\infty, 1] \cap (2, +\infty) = \emptyset$

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

$$\text{a) } \sqrt[6]{x^{-5}} : \sqrt[4]{x^{-3}} = \sqrt[12]{\frac{1}{x}} \quad (0.75)$$

$$\text{b) } \frac{\sqrt{t^{-1}} \cdot \sqrt[3]{t^{-7}}}{\sqrt[5]{t^2}} = \frac{1}{t^3} \cdot \sqrt[30]{\frac{1}{t^7}} \quad (1)$$

$$\text{c) } \frac{\sqrt[3]{a^{-2} \cdot b^5} \cdot \sqrt{a}}{\sqrt[5]{a^2 \cdot b^{-3}}} = b^2 \cdot \sqrt[30]{\frac{b^8}{a^{17}}} \quad (1.25)$$

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

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

$$\text{a) } \sqrt[3]{373248} = 72 \quad (0.75)$$

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

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

