REAL NUMBERS, POWERS AND ROOTS TEST - 3º ESO

Exercise 1: **(1 point)** Classify the following numbers:

a) $\sqrt{49} \in \mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$ b) $\sqrt{2} \in \mathbb{I}, \mathbb{R}$ c) $\sqrt[3]{-125} \in \mathbb{Z}, \mathbb{Q}, \mathbb{R}$ d) $\sqrt[4]{-81} \, \nexists$ e) $\dfrac{\sqrt{9}}{2} \in \mathbb{Q}, \mathbb{R}$

Exercise 2: **(1 point)** The policy of a certain train company states that they will refund the ticket money if the train is a 10% or more late. The stipulated travelling time from Madrid to Barcelona is of two hours and forty-five minutes but yesterday it took us three hours and two minutes. Find the percentage error and tell me if I will get my money back $E_p = 10.3\% \;\rightarrow\;$ Yes, I am getting my money back

Exercise 3: **(1 point)** Yesterday I was in a sugar spree, kill me, and I ate two fifths of the candies that I had bought for Halloween. But it gets worse, because this morning I have eaten four sevenths of the remaining ones. Luckily, I still have fifty-four candies in case some kids come knocking at my door tonight. How many candies did I buy? Should I call a doctor? Am I going to die ???
  I bought 210 candies, and I am gonna have a very bad stomachache for a couple of weeks

Exercise 4: **(3.25 points)** Work out, express as a single radical and simplify if possible:

a) $3\sqrt{500} - 7\sqrt{320} + \sqrt{3125} = -\sqrt{5}$ (1)

b) $\sqrt[5]{b^{-3}} \cdot \sqrt{b^7} : \sqrt[7]{b^{-1}} = b^3 \cdot \sqrt[70]{b^3}$ (0.75)

c) $\dfrac{\sqrt{2^{-1} \cdot 7^{-5}}}{\sqrt[5]{2^{-3} \cdot 7^6}} = \dfrac{1}{7^3} \cdot \sqrt[10]{\dfrac{2}{7^7}}$ (1)

d) $a^{2/5} : a^{-7/2} = a^3 \cdot \sqrt[10]{a^9}$ (0.5)

Exercise 5: **(1.25 points)** Work out:

a) $7.27 \cdot 10^{-5} + 8.95 \cdot 10^{-4} + 9.35 \cdot 10^{-3} = 1.03 \cdot 10^{-2}$

b) $(7.14 \cdot 10^{-4}) \cdot (4.89 \cdot 10^{-6}) = 3.49 \cdot 10^{-9}$

c) $(5.29 \cdot 10^{-7}) : (8.37 \cdot 10^{-3}) = 6.32 \cdot 10^{-5}$

Exercise 6: **(1 point)** Work out and simplify if possible:

a) $\sqrt{3136} = 56$ b) $\sqrt[7]{\dfrac{x^{21} \, y^{-43} \, z^{51}}{v^{-34}}} = \dfrac{x^3 z^7 v^4}{y^6} \cdot \sqrt[7]{\dfrac{z^2 \cdot v^6}{y}}$

Exercise 7: **(1.5 points)** Study the following unions and intersections of intervals. Express them as inequalities too:

a) $(-\infty, -3] \cup (-3, 7] = (-\infty, 7] \;\rightarrow\; x \leq 7$

b) $(-7, 5) \cap [1, 9) = [1, 5) \;\rightarrow\; 1 \leq x < 5$

c) $(-\infty, 1] \cap (1, 5] = \varnothing$