



**REAL NUMBERS, POLYNOMIALS
AND FRACTIONS TEST - 4º ESO**



Exercise 1: (1 point) The distance between the Sun and the Earth is estimated to be of 149.6 million kilometers. Knowing that the light travels at a speed of 299 800 000 m/s , how long does it take the sunlight to reach our planet? Round the answer to minutes and seconds

499 seconds = 8 minutes and 19 seconds

Exercise 2: (1 point) Rationalize the following expressions:

a) $\frac{18}{\sqrt[9]{3^4}} = 6 \cdot \sqrt[9]{3^5}$

b) $\frac{2}{\sqrt{2}} = \sqrt{2}$

c) $\frac{\sqrt{8} + \sqrt{2}}{\sqrt{8} - \sqrt{2}} = 3$

Exercise 3: (0.75 points) 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 Seville to Madrid is of two hours and thirty-seven minutes but yesterday it took us two hours and fifty-two minutes. Find the percentage error and tell me if I will get my money back $E_p = 9.55\% \rightarrow$ **Nope**

Exercise 4: (0.75 points) Study the following unions and intersections of intervals:

a) $(-5, 7] \cup [-5, +\infty) = [-5, +\infty)$

b) $[-5, -1] \cap (-2, 4) = (-2, -1]$

Exercise 5: (1 point) Solve and factorize the equation $x^6 - 2x^5 - 15x^4 + 30x^3 - 16x^2 + 32x = 0$

Roots: $x = 0, x = 2, x = \pm 4$

Factorization: $x(x-2)(x+4)(x-4)(x^2+1)$

Exercise 6: (2.75 points) Work out, express as a single radical and simplify if possible:

a) $7\sqrt[3]{625} - \sqrt[3]{320} + 2\sqrt[3]{1080} = 43 \cdot \sqrt[3]{5}$ (0.85)

b) $\frac{\sqrt[7]{2^{-5}} \cdot \sqrt{5}}{\sqrt[4]{2^3 \cdot 5^{-2}}} = \frac{5}{2} \sqrt[28]{\frac{1}{2^{13}}}$ (0.85)

c) $\sqrt[7]{a^5} : \sqrt[3]{a^{-2}} \cdot \sqrt{a^{-7}} = \frac{1}{a^2} \sqrt[42]{\frac{1}{a^5}}$ (0.65)

d) $2^{-9/4} \cdot 2^{4/3} : 2^{-1/7} = \sqrt[84]{\frac{1}{2^{65}}}$ (0.4)

Exercise 7: (2.75 points) Work out the value of the following expressions and simplify if possible:

a) $\frac{2x}{x^2 - 4x + 3} + \frac{4}{3 - x} - \frac{x}{x^2 - 9} = \frac{-3x^2 - x + 12}{x^3 - x^2 - 9x + 9}$ (1.25)

b) $\frac{x^2 + 3x - 10}{x^2 - 9} \cdot \frac{x^2 + 6x + 9}{x^2 - 4} = \frac{x^2 + 8x + 15}{x^2 - x - 6}$ (0.75)

c) $\frac{x^3 + 9x^2 + 8x}{x^2 - 10x + 25} : \frac{x^3 - x}{x^2 - 25} = \frac{x^2 + 13x + 40}{x^2 - 6x + 5}$ (0.75)

