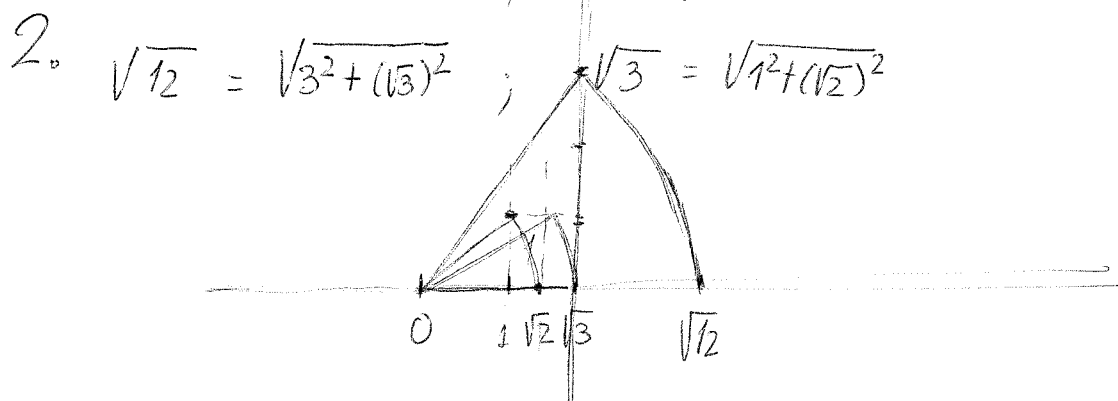


EXAMEN 4º ESO ACADÉMICAS. N.ºS REALES.

1. a) $-8,1515151\dots \in \mathbb{Q}$ b) $2,12131415\dots \in \mathbb{I}$ c) $\sqrt{100} \in \mathbb{N}$ d) $\frac{5}{7} \in \mathbb{Q}$
 e) $-5 \in \mathbb{Z}$ f) $-\frac{13}{9} \in \mathbb{Q}$ g) $\sqrt[6]{3^{-4}} \in \mathbb{I}$ h) $3,474747\dots \in \mathbb{Q}$



3. a) $x > 5 : (5, +\infty)$
- b) $x \leq -3 : (-\infty, -3]$
- c) $-2 < x \leq 6 : (-2, 6]$

d) $[-1, 8] : \{x / -1 \leq x \leq 8\}$

4. a) $\sqrt[3]{(2a^2)^3} \cdot \sqrt[3]{8a^4} = \sqrt[3]{2^3 a^6} \cdot \sqrt[3]{2^3 a^4} = \sqrt[3]{2^6 a^{10}} = 2^2 a^3 \sqrt[3]{a}$

b) $(3 - 5\sqrt{2})^2 = 9 - 2 \cdot 3 \cdot 5\sqrt{2} + (5\sqrt{2})^2 = 9 - 30\sqrt{2} + 50 = 59 - 30\sqrt{2}$

c) $(\sqrt{10} - \sqrt{2})(\sqrt{10} + \sqrt{2}) = (\sqrt{10})^2 - (\sqrt{2})^2 = 8$ $9 - \frac{2}{3} = \frac{27}{3} - \frac{2}{3} = \frac{25}{3}$

d) $\sqrt{243} - \frac{2}{3}\sqrt{3} = \sqrt{3^5} - \frac{2}{3}\sqrt{3} = 3^2\sqrt{3} - \frac{2}{3}\sqrt{3} = 9\sqrt{3} - \frac{2}{3}\sqrt{3} = \frac{25}{3}\sqrt{3}$

e) $\frac{\sqrt{5^6} \sqrt[3]{9}}{\sqrt[4]{45}} = \frac{\sqrt[12]{5^6} \sqrt[12]{9^4}}{\sqrt[12]{45^3}} = \sqrt[12]{\frac{5^6 \cdot 3^8}{(3^2 \cdot 5)^3}} = \sqrt[12]{\frac{5^6 \cdot 3^8}{3^6 \cdot 5^3}} = \sqrt[12]{3^2 \cdot 5^3} = 5^2 \sqrt[12]{3^2 \cdot 5^9}$

$\frac{33}{-24} = \frac{11}{-8}$

$$5. a) \frac{5}{2\sqrt{5}} = \frac{5\sqrt{5}}{2(\sqrt{5})^2} = \frac{5\sqrt{5}}{10} = \frac{\sqrt{5}}{2}$$

$$b) \frac{6}{\sqrt{3}-1} = \frac{6(\sqrt{3}+1)}{(\sqrt{3}-1)(\sqrt{3}+1)} = \frac{6(\sqrt{3}+1)}{(\sqrt{3})^2 - 1^2} = \frac{6(\sqrt{3}+1)}{2} = 3(\sqrt{3}+1)$$

$$c) \frac{7}{\sqrt[4]{5}} = \frac{7\sqrt[4]{5^3}}{\sqrt[4]{5}\sqrt[4]{5^3}} = \frac{7\sqrt[4]{5^3}}{\sqrt[4]{5^4}} = \frac{7\sqrt[4]{5^3}}{5}$$

$$6. a) \log 0,0001 = \log 10^{-4} = -4$$

$$b) \log_3 \frac{1}{27} = \log_3 3^{-3} = -3$$

$$c) \log_2 \sqrt{8} = \log_2 2^{3/2} = \frac{3}{2}$$

$$d) \log_{\frac{1}{5}} 25 = \log_{\frac{1}{5}} \left(\frac{1}{5}\right)^{-2} = -2$$

$$7. a) A = \frac{0,01x^3y}{x\sqrt[3]{y}} \Rightarrow \log A = \log(0,01x^3y) - \log(x\sqrt[3]{y}) \Rightarrow$$

$$\Rightarrow \log A = \log 0,01 + 3\log x + \log y - \left(\log x + \frac{1}{3}\log y\right) \Rightarrow$$

$$\Rightarrow \log A = -2 + 3\log x + \log y - \log x - \frac{1}{3}\log y \Rightarrow$$

$$\Rightarrow \log A = -2 + 2\log x + \frac{2}{3}\log y$$

$$b) B = \frac{100xy^2}{x+y} \Rightarrow \log B = \log(100xy^2) - \log(x+y) \Rightarrow$$

$$\Rightarrow \log B = \log 100 + \log x + 2\log y - \log(x+y)$$

$$\Rightarrow \log B = 2 + \log x + 2\log y - \log(x+y)$$