CONTROL TEMA 1.

1. (1,5)Racionaliza:

   a. $\frac{5+\sqrt{11}}{\sqrt{13-\sqrt{5}}}$ b. $\frac{-3}{\sqrt{5}-\sqrt{3}+\sqrt{11}}$

2. (1)Calcula y expresa el resultado en notación científica:

$$\frac{4{,}07 \cdot 10^{-5} \cdot (5{,}37 \cdot 10^{3} - 2{,}07 \cdot 10^{-3})^{3}}{3{,}97 \cdot 10^{2} + 6{,}53 \cdot 10^{-3}} =$$

3. (1)Escribe las aproximaciones a las diezmillonésimas del número, 8,6521459875. Calcula el error absoluto y el error relativo.

4. (1,5) Calcula y simplifica:

   a. $3\sqrt[4]{192} - \frac{1}{5}\sqrt[4]{3000} + \frac{3}{4}\sqrt[3]{\frac{648}{16}} =$

   b. $\sqrt[5]{\frac{\sqrt{144 \sqrt[4]{162} \cdot \left(\sqrt[3]{48}\right)^{5}}}{\sqrt[6]{384}}}$

   c. $\frac{(-12)^4(-8)^5 15^4(-9)^{-5}}{30^5(-81)^5 5^{-4}}$

5. (1) Representa en la recta real $\sqrt{63}$, $-\frac{53}{8}$

6. (1)Si log 2=0,3010, log 3= 0,4771, log 5= 0,6990. Calcula:

   a. $\log \sqrt[6]{\frac{1}{0{,}128}}$ b. $\log \frac{540}{64}$

7. (1) Escribe el entorno, el intervalo y representa:

   a. $|x+6| \geq 4$ b. $|x+2| < 5$

8. (1) Escribe la expresión algebraica de:

   $\log A = 4 + 4\log x - \frac{3}{7}\log(y) - 3\log z - 5\log\frac{x}{y}$

9. (1) Calcula $|x+5| - 3|3x-2|$

TEMA 1. 1º Bach A 2020-21

① (1,5)

a) $\frac{5+\sqrt{11}}{\sqrt{13-\sqrt{5}}} = \frac{(5+\sqrt{11})(\sqrt{13-\sqrt{5}})}{(\sqrt{13-\sqrt{5}})^2} = \frac{(5+\sqrt{11})(\sqrt{13-\sqrt{5}})(13+\sqrt{5})}{(13-\sqrt{5})(13+\sqrt{5})} =$

$= \frac{(5+\sqrt{11})(\sqrt{13-\sqrt{5}})(13+\sqrt{5})}{13^2-\sqrt{5}^2} = \frac{(5+\sqrt{11})(\sqrt{13-\sqrt{5}})(13+\sqrt{5})}{169-5} = \frac{(5+\sqrt{11})(\sqrt{13-\sqrt{5}})(13+\sqrt{5})}{164}$

b) $\frac{-3}{\sqrt{5}-\sqrt{3}+\sqrt{11}} = \frac{-3\cdot[(\sqrt{5}-\sqrt{3})-\sqrt{11}]}{[(\sqrt{5}-\sqrt{3})+\sqrt{11}][(\sqrt{5}-\sqrt{3})-\sqrt{11}]} = \frac{-3[\sqrt{5}-\sqrt{3}-\sqrt{11}]}{(\sqrt{5}-\sqrt{3})^2-(\sqrt{11})^2} =$

$= \frac{-3[\sqrt{5}-\sqrt{3}-\sqrt{11}]}{5+3-2\sqrt{15}-11} = \frac{-3[\sqrt{5}-\sqrt{3}-\sqrt{11}](-3+2\sqrt{15})}{(-3-2\sqrt{15})(-3+2\sqrt{15})} = \frac{-3[\sqrt{5}-\sqrt{3}-\sqrt{11}](-3+2\sqrt{15})}{9-4\cdot15} =$

$= \frac{-3[\sqrt{5}-\sqrt{3}-\sqrt{11}](-3+2\sqrt{15})}{-51}$

② (1)

$\frac{4{,}07\cdot10^{-5}\,(5{,}37\cdot10^3-2{,}07\cdot10^{-3})^3}{3{,}97\cdot10^2+6{,}53\cdot10^{-3}} = \frac{4{,}07\cdot10^{-5}(5370000\cdot10^{-3}-2{,}07\cdot10^{-3})^3}{397000\cdot10^{-3}+6{,}53\cdot10^{-3}} =$

$= \frac{4{,}07\cdot10^{-5}\,(5{,}36999793\cdot10^6\cdot10^{-3})^3}{3{,}9700653\cdot10^5\cdot10^{-3}} = \frac{4{,}07\cdot10^{-5}\,(5{,}36999793\cdot10^3)^3}{3{,}9700653\cdot10^2} =$

$= \frac{4{,}07\cdot10^{-5}\cdot154{,}8539739\cdot10^9}{3{,}9700653\cdot10^2} = \frac{6{,}302556739\cdot10^6}{3{,}9700653\cdot10^2} = 1{,}587519666\cdot10^4$

③ (1)

$N = 8{,}6521459875 \simeq 8{,}6521460$

$E_A = |8{,}6521459875-8{,}6521460| = 1{,}25\cdot10^{-8}$

$E_R = \frac{1{,}25\cdot10^{-8}}{8{,}6521459875} = 1{,}444728281\cdot10^{-9}$

④ (1,5)

a) $3\sqrt[4]{192} - \frac{1}{5}\sqrt[4]{3000} + \frac{3}{4}\sqrt[3]{\frac{648}{16}} = 3\sqrt[4]{2^6\cdot3} - \frac{1}{5}\sqrt[4]{2^3\cdot3\cdot5^3} + \frac{3}{4}\sqrt[3]{\frac{2^3\cdot3^4}{2^4}} =$

$= 3\cdot2\sqrt[4]{2^2\cdot3} - \frac{1}{5}\sqrt[4]{2^3\cdot3\cdot5^3} + \frac{9}{4}\sqrt[3]{2^{-1}\cdot3}$

b) $\sqrt[5]{\frac{\sqrt{144\cdot\sqrt[4]{162}\cdot(\sqrt[3]{48})^5}}{\sqrt[6]{384}}} = \frac{\sqrt[10]{2^4\cdot3^2}\,\sqrt[40]{2\cdot3^4}\cdot\sqrt[30]{2^{20}\cdot3^5}}{\sqrt[30]{2^7\cdot3}} = \sqrt[120]{\frac{2^{48}\cdot3^{24}\cdot2^3\cdot3^{12}\cdot2^{80}\cdot3^{20}}{2^{28}\cdot3^4}} =$

$= \sqrt[120]{\frac{2^{131}\cdot3^{56}}{2^{28}\cdot3^4}} = \sqrt[120]{2^{103}\cdot3^{52}}$

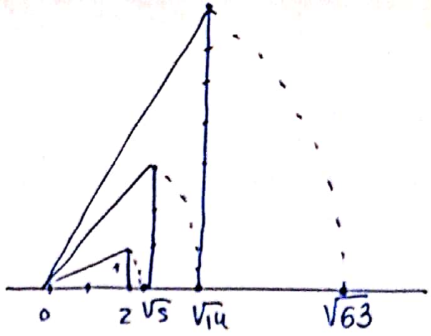
c) $\frac{(-12)^4\,(-8)^5\,15^4\cdot(-9)^{-5}}{30^5\cdot(-81)^5\cdot5^{-4}} = \frac{(-2^2\cdot3)^4\cdot(-2^3)^5(3\cdot5)^4\cdot(-3^2)^{-5}}{(2\cdot3\cdot5)^5\cdot(-3^4)^5\cdot5^{-4}} =$

$= \frac{2^8\cdot3^4\cdot(-2^{15})\cdot3^4\cdot5^4\cdot(-3^{-10})}{2^5\cdot3^5\cdot5^5\cdot(-3^{20})\cdot5^{-4}} = \frac{+2^{23}\cdot3^{-2}\cdot5^4}{-2^5\,3^{25}\cdot5} = -2^{18}\cdot3^{-27}\cdot5^3$

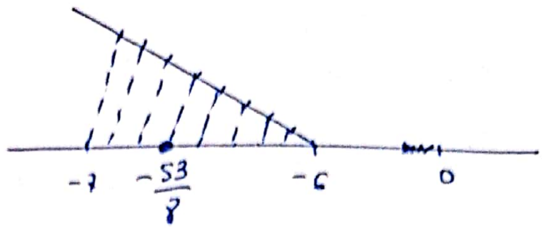
(5) (1) $\sqrt{63} = \sqrt{7^2+\sqrt{14}^2}$

$\sqrt{14} = \sqrt{3^2+\sqrt{5}^2}$

$\sqrt{5} = \sqrt{2^2+1^2}$



$-\frac{53}{8} = -6\frac{5}{8}$



(6) (1) a) $\log \sqrt[6]{\frac{1}{0,128}} = \frac{1}{6}\log\frac{1}{\frac{128}{1000}} = \frac{1}{6}\log\frac{1000}{128} = \frac{1}{6}\left[\log 1000 - \log 128\right] =$

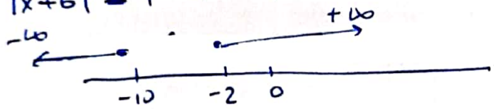
$= \frac{1}{6}\left[3-\log 2^7\right] = \frac{1}{6}\left[3-7\log 2\right] = \frac{1}{6}\left[3-7\cdot 0,3010\right] = 0,1488$

b) $\log\frac{540}{64} = \log\frac{2^2\cdot 3^3\cdot 5}{2^6} = \log\frac{3^3\cdot 5}{2^4} = \log 3^3+\log 5-\log 2^4 =$

$= 3\log 3+\log 5-4\log 2 = 3\cdot 0,4771+0,6990-4\cdot 0,3010 = 0,9263$

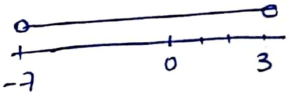
(7) (1) a) $|x+6|\geq 4 \Rightarrow x\in(-\infty,-10]\cup[-2,+\infty)$ no es entorno

$|x+6|<4 \rightarrow -4<x+6<4 \rightarrow -4-6<x<4-6 \rightarrow -10<x<-2$



b) $|x+2|<5 \rightarrow -5<x+2<5 \rightarrow -5-2<x<5-2 \rightarrow -7<x<3$

$\rightarrow x\in(-7,3) \Rightarrow E_5(-2)$



(8) (1) $\log A = 4+4\log x-\frac{3}{7}\log(y)-3\log z-5\log\frac{x}{y}$

$\log A = \log 10000+\log x^4-\log\sqrt[7]{y^3}-\log z^3-\log\left(\frac{x}{y}\right)^5$

$\log A = \log\frac{10000\cdot x^4}{\sqrt[7]{y^3}\cdot z^3\cdot\frac{x^5}{y^5}} = \log\frac{10000\, x^4\cdot y^5}{\sqrt[7]{y^3}\cdot z^3 x^5}$

$A = \frac{10000\, y^5}{\sqrt[7]{y^3}\, z^3 x}$

(9) (1) $|x+5|-3|3x-2| = \begin{cases} (x+5)-3(3x-2) & \text{si } x+5\geq 0,\ 3x-2\geq 0 \\ -(x+5)-3(3x-2) & \text{si } x+5<0,\ 3x-2\geq 0 \\ (x+5)-3(-3x+2) & \text{si } x+5\geq 0,\ 3x-2<0 \\ -(x+5)-3(-3x+2) & \text{si } x+5<0,\ \text{si } 3x-2<0 \end{cases} = \begin{cases} -8x+11 & x\geq -5,\ x\geq 2/3 \quad x\geq 2/3 \\ -10x+1 & x<-5,\ x\geq 2/3 \quad \not\exists \\ 10x-1 & x\geq -5,\ x<2/3 \quad -5\leq x<2/3 \\ 8x-11 & x<-5,\ x<2/3 \quad x<-5 \end{cases}$