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Examen de Matemáticas Ciencias Sociales I – 1º de Bachillerato

1. Calcula: **(1,5 puntos)**

a) $[7\cdot 2 - 3 + 4] \div 2]\cdot 3 + [6 - (-4)]^2 + 5$; **b)** $(4 - 7 - (-5) + 3)^2 + 5\cdot(-5) \div 5 - 30$

c) $24 - [(-3) + 5]^3 - [4^2 \div (5 - (-3))]^2$

2. Realiza las siguientes operaciones: **(2 puntos)**

a) $\left[\frac{1}{3}+\frac{1}{2}\left(\frac{1}{2}-\frac{1}{4}\right)+5\right]-3\cdot\left[4\div\left(\frac{3}{5}+1\right)\right]$; **b)** $\frac{\frac{3}{5}-\frac{1}{4}}{1-\frac{1}{2}+\frac{4}{3}}-2\cdot\frac{4}{5}+\left(\frac{1}{2}\right)^{-1}$

3. Simplifica al máximo los radicales siguientes extrayendo factores: **(1,5 puntos)**

a) $\sqrt{216x^6y^8z^2}$; **b)** $\sqrt[3]{\frac{64x^9}{125y^7}}$; **c)** $\sqrt[4]{162a^9b^{17}}$

4. Efectúa las operaciones indicadas reduciendo a índice común si fuera preciso y simplifica al máximo el resultado: **(1 punto)**

a) $\frac{\sqrt{x^5}}{\sqrt[5]{x^4}}$; **b)** $\sqrt[4]{\frac{\sqrt[3]{x^6}}{y}}\cdot\sqrt{\frac{\sqrt[3]{y^2}}{\sqrt[3]{x^2}}}$

5. Efectúa y simplifica, extrayendo el mayor número de factores posible: **(1 punto)**

a) $\frac{\sqrt{5x^7y^5}\cdot\sqrt{3x^6y^3}}{\sqrt{3x^3y^2}}$; **b)** $\left(\sqrt{3}-4\sqrt{48}\right)\cdot\left(\sqrt{12}-3\sqrt{3}\right)$

6. Racionaliza las siguientes expresiones y simplifica el resultado: **(1 punto)**

a) $\frac{\sqrt{x}}{\sqrt[3]{x}}$; **b)** $\frac{\sqrt{3}-2\sqrt{2}}{\sqrt{3}-\sqrt{2}}$

7. Resuelve las siguientes ecuaciones: **(2 puntos)**

a) $\frac{2x-4}{5}-\frac{20-x}{4}-6=\frac{1}{6}-\frac{x+\frac{1}{2}}{3}$; **b)** $\frac{5}{6}\cdot\left(x-\frac{1}{3}\right)+\frac{7}{6}\cdot\left(\frac{x}{5}-\frac{1}{7}\right)=4+\frac{8}{9}$

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① a) $[7\cdot 2-3+4:2]\cdot 3+[6-(-4)]^2+5=(14-3+2)\cdot 3+10^2+5=$

$=13\cdot 3+100+5=39+100+5=\underline{\underline{144}}.$

b) $(4-7-(-5)+3)^2+5\cdot(-5):5-30=5^2-25:5-30=$

$=25-5-30=\underline{\underline{-10}}.$

c) $24-[(-3)+5]^3-[4^2:(5-(-3))]^2=24-2^3-(16:8)^2=$

$=24-8-4=\underline{\underline{12}}.$

② a) $\left[\frac{1}{3}+\frac{1}{2}\left(\frac{1}{2}-\frac{1}{4}\right)+5\right]-3\cdot\left[4:\left(\frac{3}{5}+1\right)\right]=$

$=\left(\frac{1}{3}+\frac{1}{2}\cdot\frac{1}{4}+5\right)-3\cdot\left(4:\frac{8}{5}\right)=\left(\frac{1}{3}+\frac{1}{8}+5\right)-3\cdot\frac{20}{8}=$

$=\frac{8}{24}+\frac{3}{24}+\frac{120}{24}-\frac{60}{8}=\frac{131}{24}-\frac{15}{2}=$

$=\frac{131}{24}-\frac{180}{24}=\underline{\underline{-\frac{49}{24}}}.$

b) $\dfrac{\frac{3}{5}-\frac{1}{4}}{1-\frac{1}{2}+\frac{4}{3}}-2\cdot\frac{4}{5}+\left(\frac{1}{2}\right)^{-1}=\dfrac{\frac{12}{20}-\frac{5}{20}}{\frac{6}{6}-\frac{3}{6}+\frac{8}{6}}-\frac{8}{5}+2=$

$=\dfrac{\frac{7}{20}}{\frac{11}{6}}-\frac{8}{5}+2=\frac{42}{220}-\frac{8}{5}+2=$

$=\frac{42}{220}-\frac{352}{220}+\frac{440}{220}=\frac{130}{220}=\underline{\underline{\frac{13}{22}}}$

③ a) $\sqrt{216x^6y^8z^2}=\sqrt{2^3\cdot 3^3x^6y^8z^2}=2\cdot 3x^3y^4z\sqrt{2\cdot 3}=$

$=\underline{\underline{6x^3y^4z\sqrt{6}}}$

b) $\sqrt[3]{\frac{64x^9}{125y^7}}=\sqrt[3]{\frac{2^6x^9}{5^3y^7}}=\frac{2^2x^3}{5y^2}\sqrt[3]{\frac{1}{y}}=\underline{\underline{\frac{4x^3}{5y^2}\sqrt[3]{\frac{1}{y}}}}$

c) $\sqrt[4]{162a^9b^{17}}=\sqrt[4]{2\cdot 3^4\cdot a^9b^{17}}=\underline{\underline{3a^2b^4\sqrt[4]{2ab}}}$

④ a) $\dfrac{\sqrt{x^5}}{\sqrt[5]{x^4}}=\dfrac{\sqrt[10]{x^{25}}}{\sqrt[10]{x^8}}=\sqrt[10]{x^{17}}=\underline{\underline{x\sqrt[10]{x^7}}}$

b) $\sqrt[4]{\dfrac{\sqrt[3]{x^6}}{y}}\cdot\sqrt{\dfrac{\sqrt[3]{y^2}}{\sqrt[3]{x^2}}}=\sqrt[4]{\frac{x^2}{y}}\cdot\sqrt{\sqrt[3]{\frac{y^2}{x^2}}}=\sqrt[4]{\frac{x^2}{y}}\sqrt[6]{\frac{y^2}{x^2}}=$

$=\sqrt[12]{\frac{x^6}{y^3}}\sqrt[12]{\frac{y^4}{x^4}}=\sqrt[12]{\frac{x^6y^4}{y^3x^4}}=\underline{\underline{\sqrt[12]{x^2y}}}$

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⑤ a) $\frac{\sqrt{5x^7y^5}\sqrt{3x^6y^3}}{\sqrt{3x^3y^2}} = \frac{\sqrt{15x^{13}y^8}}{\sqrt{3x^3y^2}} = \sqrt{\frac{15x^{13}y^8}{3x^3y^2}} =$

$= \sqrt{5x^{10}y^6} = \underline{x^5y^3\sqrt{5}}$

b) $(\sqrt{3} - 4\sqrt{48})(\sqrt{12} - 3\sqrt{3}) = \sqrt{36} - 3\sqrt{9} - 4\sqrt{576} +$

$+ 12\sqrt{144} = 6 - 3\cdot 3 - 4\cdot 24 + 12\cdot 12 =$

$= 6 - 9 - 96 + 144 = \underline{45}$

⑥ a) $\frac{\sqrt{x}}{\sqrt[3]{x}} = \frac{\sqrt{x}\sqrt[3]{x^2}}{\sqrt[3]{x}\sqrt[3]{x^2}} = \frac{\sqrt[6]{x^3}\sqrt[6]{x^4}}{x} = \frac{\sqrt[6]{x^7}}{x} = \frac{x\sqrt[6]{x}}{x} = \underline{\sqrt[6]{x}}$

b) $\frac{\sqrt{3} - 2\sqrt{2}}{\sqrt{3} - \sqrt{2}} = \frac{(\sqrt{3} - 2\sqrt{2})(\sqrt{3} + \sqrt{2})}{(\sqrt{3} - \sqrt{2})(\sqrt{3} + \sqrt{2})} = \frac{3 + \sqrt{6} - 2\sqrt{6} - 4}{(\sqrt{3})^2 - (\sqrt{2})^2} =$

$= \frac{-1 - \sqrt{6}}{3 - 2} = \frac{-1 - \sqrt{6}}{1} = \underline{-1 - \sqrt{6}}$

⑦ a) $\frac{2x-4}{5} - \frac{20-x}{4} - 6 = \frac{1}{6} - \frac{x + \frac{1}{2}}{3}$;

$\frac{24x-48}{60} - \frac{300-15x}{60} - \frac{360}{60} = \frac{10}{60} - \frac{20x+10}{60}$;

$24x - 48 - 300 + 15x - 360 = 10 - 20x - 10$;

$39x - 708 = -20x \Rightarrow 59x = 708 \Rightarrow x = \frac{708}{59} \Rightarrow \underline{x = 12}$

b) $\frac{5}{6}\left(x - \frac{1}{3}\right) + \frac{7}{6}\left(\frac{x}{5} - \frac{1}{7}\right) = 4 + \frac{8}{9}$;

$\frac{5}{6}\left(\frac{3x-1}{3}\right) + \frac{7}{6}\left(\frac{7x-5}{35}\right) = \frac{36+8}{9}$;

$\frac{15x-5}{18} + \frac{49x-35}{210} = \frac{44}{9}$;

$\frac{35(15x-5)}{630} + \frac{3(49x-35)}{630} = \frac{3080}{630}$;

$525x - 175 + 147x - 105 = 3080$;

$672x = 3360$;

$x = \frac{3360}{672}$;

$\underline{x = 5}$