Examen de Matemáticas Ciencias Sociales I – 1º de Bachillerato

1. Calcula: (1,5 puntos)

a) $(-8)\div(-4) + 7\cdot[-3 + (-4)]$; **b)** $3 - (-2)\cdot[-3 - (-3 + (-2))^2]$

c) $3\cdot(5 - 16\div 4)^2 + 3\cdot 5^3 - (-4)\cdot[3 - (-2)\cdot(-10)]$

2. Realiza las siguientes operaciones: **(3 puntos)**

a) $\frac{9}{11}\left(\frac{3}{4}-\frac{1}{5}\right)-\frac{3}{8}\left(\frac{5}{3}-\frac{1}{2}\right)$ **b)** $\frac{-\frac{}{3}\left(3-\frac{1}{}\right)}{\frac{5}{6}\left|--1\right)}$ **c)** $\frac{\left[\frac{}{3}\left(\frac{-1}{}\right)\right]^2}{\left(\frac{5}{3}\right)\div\left(-\right)^2}$

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

a) $\sqrt{12x^3y^5z^2}$; **b)** $\sqrt[3]{\frac{8x^4}{81y^6}}$; **c)** $\sqrt[3]{-16x^4y^9}$

4. Efectúa las operaciones indicadas reduciendo a índice común si fuera preciso y simplifica al máximo el resultado: **(1,5 puntos)**

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

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

a) $\sqrt[4]{\frac{x\ y^7}{xy^3}}$; **b)** $\frac{\sqrt{3xy^3}\cdot\sqrt{x\ y}}{\sqrt{6x\ y^2}}$; **c)** $\left(4\sqrt{x}-\sqrt{y}\right)\cdot\left(\sqrt{x}+2\sqrt{y}\right)$

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

a) $\frac{\sqrt{2-x}}{\sqrt{1+x}}$; **b)** $\frac{2\sqrt{6}-3\sqrt{3}}{2\sqrt{2}-\sqrt{3}}$

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1. a) $(-8):(-4)+7[-3+(-4)] = 2 + 7\cdot(-7) = 2-49 = \underline{\underline{-47}}$.

b) $3-(-2)[-3-(-3+(-2))^2] = 3-(-2)(-3-25) =$

$= 3-(-2)(-28) = 3-56 = \underline{\underline{-53}}$

c) $3(5-16:4)^2+3\cdot 5^3-(-4)[3-(-2)(-10)] =$

$= 3(5-4)^2+3\cdot 125-(-4)(3-20) =$

$= 3\cdot 1^2+375-(-4)(-17) = 3+375-68 = \underline{\underline{310}}$

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2. a) $\frac{9}{11}\left(\frac{3}{4}-\frac{1}{5}\right)-\frac{3}{8}\left(\frac{5}{3}-\frac{1}{2}\right) = \frac{9}{11}\left(\frac{15-4}{20}\right)-\frac{3}{8}\left(\frac{10-3}{6}\right) =$

$= \frac{9}{\cancel{11}}\cdot\frac{\cancel{11}}{20}-\frac{3}{8}\cdot\frac{7}{6} = \frac{9}{20}-\frac{21}{48} = \frac{108-105}{240} = \frac{3}{240} = \underline{\underline{\frac{1}{80}}}$

b) $\dfrac{-\frac{2}{3}\left(3-\frac{1}{5}\right)}{\frac{5}{6}\left(\frac{1}{2}-1\right)} = \dfrac{-\frac{2}{3}\left(\frac{15-1}{5}\right)}{\frac{5}{6}\left(\frac{1-2}{2}\right)} = \dfrac{-\frac{2}{3}\cdot\frac{14}{5}}{\frac{5}{6}\cdot\frac{-1}{2}} =$

$= \dfrac{-\frac{28}{15}}{-\frac{5}{12}} = \frac{28\cdot 12}{15\cdot 5} = \frac{336}{75} = \underline{\underline{\frac{112}{25}}}$

c) $\dfrac{\left[\frac{2}{3}\left(\frac{-1}{4}\right)\right]^2}{\left(\frac{5}{3}\right)^5 \div \left(\frac{5}{3}\right)^2} = \dfrac{\left(\frac{-2}{12}\right)^2}{\left(\frac{5}{3}\right)^3} = \dfrac{\frac{4}{144}}{\frac{125}{27}} = \frac{4\cdot 27}{144\cdot 125} =$

$= \frac{108}{18000} = \underline{\underline{\frac{3}{500}}}$

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3. a) $\sqrt{12x^3y^5z^2} = \sqrt{2^2\cdot 3x^3y^5z^2} = \underline{\underline{2xy^2z\sqrt{3xy}}}$

b) $\sqrt[3]{\frac{8x^4}{81y^6}} = \sqrt[3]{\frac{2^3x^4}{3^4y^6}} = \underline{\underline{\frac{2x}{3y^2}\cdot\sqrt[3]{\frac{x}{3}}}}$

c) $\sqrt[3]{-16x^4y^9} = \sqrt[3]{-2^4x^4y^9} = \underline{\underline{2xy^3\sqrt[3]{-2x} = -2xy^3\sqrt[3]{2x}}}$

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

$= \sqrt[6]{2^7} = \underline{\underline{2\cdot\sqrt[6]{2}}}$

b) $\dfrac{\sqrt{x}}{\sqrt[3]{x^2}} = \dfrac{\sqrt[6]{x^3}}{\sqrt[6]{x^4}} = \sqrt[6]{\frac{x^3}{x^4}} = \sqrt[6]{x^{-1}} = \underline{\underline{\sqrt[6]{\frac{1}{x}}}}$

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

$= \sqrt[12]{\frac{x^3}{y^6}} \sqrt[12]{\frac{y^2}{x^4}} = \sqrt[12]{\frac{x^3 y^2}{y^6 x^4}} = \underline{\underline{\sqrt[12]{\frac{1}{x y^4}}}}$

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5. a) $\sqrt[4]{\frac{x^9 y^7}{x y^3}} = \sqrt[4]{x^8 y^4} = \underline{\underline{x^2 y}}$

b) $\frac{\sqrt{3xy^3}\,\sqrt{2x^2y}}{\sqrt{6x^3y^2}} = \frac{\sqrt{6x^3y^4}}{\sqrt{6x^3y^2}} = \sqrt{\frac{6x^3y^4}{6x^3y^2}} = \sqrt{y^2} = \underline{\underline{y}}$

c) $(4\sqrt{x} - \sqrt{y})(\sqrt{x} + 2\sqrt{y}) = 4(\sqrt{x})^2 + 8\sqrt{x}\sqrt{y} - \sqrt{y}\sqrt{x} - 2(\sqrt{y})^2$

$= 4x + 8\sqrt{xy} - \sqrt{xy} - 2y = \underline{\underline{4x - 2y + 7\sqrt{xy}}}$

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6. a) $\frac{\sqrt{2-x}}{\sqrt{1+x}} = \frac{\sqrt{2-x}\,\sqrt{1+x}}{\sqrt{1+x}\,\sqrt{1+x}} = \frac{\sqrt{(2-x)(1+x)}}{(\sqrt{1+x})^2} =$

$= \frac{\sqrt{2+2x-x-x^2}}{1+x} = \underline{\underline{\frac{\sqrt{2+x-x^2}}{1+x}}}$

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

$= \frac{4\sqrt{12} + 2\sqrt{18} - 6\sqrt{6} - 3\sqrt{9}}{(2\sqrt{2})^2 - (\sqrt{3})^2} = \frac{4\sqrt{2^2 \cdot 3} + 2\sqrt{3^2 \cdot 2} - 6\sqrt{6} - 9}{8 - 3}$

$= \underline{\underline{\frac{8\sqrt{3} + 6\sqrt{2} - 6\sqrt{6} - 9}{5}}}$