

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) $\frac{-\frac{1}{3} \left(3 - \frac{1}{2} \right)}{\frac{5}{6} | - -1 |}$ c) $\frac{\left[\frac{1}{3} \left(\frac{-1}{2} \right) \right]^2}{\left(\frac{5}{3} \right) \div \left(- \right)^2}$

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

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) $3 - (-2)[-3 - (-3 + (-2))] = 3 - (-2)(-3 - 25) =$
 $= 3 - (-2)(-28) = 3 - 56 = \underline{\underline{-53}}$
- c) $3(5 - 16 : 4)^2 + 3 \cdot 5^3 - (-4)[3 - (-2)(-10)] =$
 $= 3(5 - 4)^2 + 3 \cdot 125 - (-4)(3 - 20) =$
 $= 3 \cdot 1^2 + 375 - (-4)(-17) = 3 + 375 - 68 = \underline{\underline{310}}$

2. a) $\frac{9}{11} \left(\frac{3}{4} - \frac{1}{5} \right) - \frac{3}{8} \left(\frac{5}{3} - \frac{1}{2} \right) = \frac{9}{11} \left(\frac{15-4}{20} \right) - \frac{3}{8} \left(\frac{10-3}{6} \right) =$
 $= \frac{9}{11} \cdot \frac{11}{20} - \frac{3}{8} \cdot \frac{7}{6} = \frac{9}{20} - \frac{21}{48} = \frac{108-105}{240} = \frac{3}{240} = \underline{\underline{\frac{1}{80}}}$

b) $\frac{-\frac{2}{3} \left(3 - \frac{1}{5} \right)}{\frac{5}{6} \left(\frac{1}{2} - 1 \right)} = \frac{-\frac{2}{3} \left(\frac{15-1}{5} \right)}{\frac{5}{6} \left(\frac{1-2}{2} \right)} = \frac{-\frac{2}{3} \cdot \frac{14}{5}}{\frac{5}{6} \cdot \frac{-1}{2}} =$
 $= \frac{-\frac{28}{15}}{-\frac{5}{12}} = \frac{28 \cdot 12}{15 \cdot 5} = \frac{336}{75} = \underline{\underline{\frac{112}{25}}}$

c) $\frac{\left[\frac{2}{3} \left(\frac{-1}{4} \right) \right]^2}{\left(\frac{5}{3} \right)^5 \div \left(\frac{5}{3} \right)^2} = \frac{\left(\frac{-2}{12} \right)^2}{\left(\frac{5}{3} \right)^3} = \frac{\frac{4}{144}}{\frac{125}{27}} = \frac{4 \cdot 27}{144 \cdot 125} =$
 $= \frac{108}{18000} = \underline{\underline{\frac{3}{500}}}$

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

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

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

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

$$\begin{aligned}
 c) \quad & \sqrt[4]{\frac{\sqrt[3]{x^3}}{y^2}} \cdot \sqrt{\frac{\sqrt[3]{y}}{\sqrt[3]{x^2}}} = \sqrt[4]{\frac{x}{y^2}} \cdot \sqrt{\frac{\sqrt[3]{y}}{\sqrt[3]{x^2}}} = \sqrt[4]{\frac{x}{y^2}} \cdot \sqrt[6]{\frac{y}{x^2}} \\
 & = \sqrt[12]{\frac{x^3}{y^6}} \sqrt[12]{\frac{y^2}{x^4}} = \sqrt[12]{\frac{x^3 y^2}{y^6 x^4}} = \sqrt[12]{\frac{1}{x y^4}}
 \end{aligned}$$

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

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

$$\begin{aligned}
 c) \quad & (4\sqrt{x} - \sqrt{y})(\sqrt{x} + 2\sqrt{y}) = 4(\sqrt{x})^2 + 8\sqrt{x}\sqrt{y} - \sqrt{y}\sqrt{x} - 2(\sqrt{y})^2 \\
 & = 4x + 8\sqrt{xy} - \sqrt{xy} - 2y = \underline{\underline{4x - 2y + 7\sqrt{xy}}}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad a) \quad & \frac{\sqrt{2-x}}{\sqrt{1+x}} = \frac{\sqrt{2-x} \sqrt{1+x}}{\sqrt{1+x} \sqrt{1+x}} = \frac{\sqrt{(2-x)(1+x)}}{(\sqrt{1+x})^2} = \\
 & = \frac{\sqrt{2+2x-x-x^2}}{1+x} = \frac{\sqrt{2+x-x^2}}{1+x}
 \end{aligned}$$

$$\begin{aligned}
 b) \quad & \frac{2\sqrt{6} - 3\sqrt{3}}{2\sqrt{2} - \sqrt{3}} = \frac{(2\sqrt{6} - 3\sqrt{3})(2\sqrt{2} + \sqrt{3})}{(2\sqrt{2} - \sqrt{3})(2\sqrt{2} + \sqrt{3})} = \\
 & = \frac{4\sqrt{12} + 2\sqrt{18} - 6\sqrt{6} - 3\sqrt{9}}{(2\sqrt{2})^2 - (\sqrt{3})^2} = \frac{4\sqrt{2^2 \cdot 3} + 2\sqrt{3^2 \cdot 2} - 6\sqrt{6} - 9}{8 - 3} \\
 & = \frac{8\sqrt{3} + 6\sqrt{2} - 6\sqrt{6} - 9}{5}
 \end{aligned}$$
