

**Examen de Matemáticas Ciencias Sociales I – 1º de Bachillerato**

1. Calcula: (1,5 puntos)

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

c)  $(-2) \cdot (6 - 8 \div 4)^3 + (-3) \cdot (-4)^3 - 2 \cdot [5 + (-6) \cdot (-3)]$

2. Realiza las siguientes operaciones: (3 puntos)

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

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

a)  $\sqrt{72x^5y^5z^2}$  ;    b)  $\sqrt[3]{\frac{27x^5}{16y^9}}$  ;    c)  $\sqrt[3]{-8x^7y^{12}}$

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

a)  $\sqrt[3]{16} \cdot \sqrt{12}$  ;    b)  $\frac{\sqrt{a}}{\sqrt[6]{a^4}}$  ;    c)  $\sqrt[6]{\frac{\sqrt[3]{x^3}}{y^2}} \cdot \sqrt{\frac{\sqrt[3]{y^2}}{\sqrt[3]{x}}}$

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

a)  $\sqrt[5]{\frac{x^{11}y^9}{x^6y^3}}$  ;    b)  $\frac{\sqrt{4x^4y^3} \cdot \sqrt{2x^2y^5}}{\sqrt{8x^3y^2}}$  ;    c)  $(\sqrt{a} - 2\sqrt{b}) \cdot (3\sqrt{a} + 4b)$

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

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

$$1. \ a) \ 6 : (-3) + (-5)[2 + (-5)] = -2 + (-5)(-3) = -2 + 15 = \underline{13}$$

$$b) \ -3 - (-4) \cdot [5 - (4 - (-3))^2] = -3 + 4 \cdot (5 - 7^2) =$$

$$= -3 + 4(5 - 49) = -3 + 4 \cdot (-44) = -3 - 176 = \underline{-179}$$

$$c) \ (-2)(6 - 8 : 4)^3 + (-3)(-4)^3 - 2[5 + (-6)(-3)] =$$

$$= (-2)(6 - 2)^3 + (-3)(-64) - 2(5 + 18) =$$

$$= (-2)4^3 + 192 - 2 \cdot 23 = (-2)64 + 192 - 46 =$$

$$= -128 + 192 - 46 = \underline{18}$$

$$2. \ a) \ \frac{2}{5} - \frac{2}{5} \left(1 - \frac{1}{2}\right) + \frac{3}{4} \left(\frac{7}{3} - \frac{9}{6}\right) = \frac{2}{5} - \frac{2}{5} \cdot \frac{1}{2} + \frac{3}{4} \cdot \frac{5}{6} =$$

$$= \frac{2}{5} - \frac{2}{10} + \frac{15}{24} = \frac{2}{5} - \frac{1}{5} + \frac{5}{8} = \frac{16 - 8 + 25}{40} = \underline{\frac{33}{40}}$$

$$b) \ 5 - 2 \cdot \frac{\frac{1}{4} - 1}{2 + \frac{1}{5}} = 5 - 2 \cdot \frac{-\frac{3}{4}}{\frac{11}{5}} = 5 - 2 \left(-\frac{15}{44}\right) =$$

$$= 5 + \frac{30}{44} = 5 + \frac{15}{22} = \frac{110 + 15}{22} = \underline{\frac{125}{22}}$$

$$c) \ 8 \cdot \frac{\frac{1}{3} - \frac{2}{5} \cdot \frac{5}{3}}{2 - \frac{9}{2} \cdot \frac{2}{3}} - 3 = 8 \cdot \frac{\frac{1}{3} - \frac{10}{15}}{2 - \frac{18}{6}} - 3 =$$

$$= 8 \cdot \frac{\frac{1}{3} - \frac{2}{3}}{2 - \frac{9}{3}} - 3 = 8 \cdot \frac{-\frac{1}{3}}{-1} - 3 = 8 \cdot \frac{1}{3} - 3 =$$

$$= \frac{8}{3} - 3 = \frac{8}{3} - \frac{9}{3} = \underline{-\frac{1}{3}}$$

$$3. \ a) \ \sqrt{72x^5y^8z^2} = \sqrt{2^3 \cdot 3^2 \cdot x^5 y^8 z^2} = 2 \cdot 3 x^2 y^2 z \sqrt{2xy} =$$

$$= \underline{6x^2y^2z\sqrt{2xy}}$$

$$b) \ \sqrt[3]{\frac{27x^5}{16y^9}} = \sqrt[3]{\frac{3^3 x^5}{2^4 y^9}} = \frac{3x}{2y^3} \sqrt[3]{\frac{x^2}{2}}$$

$$c) \ \sqrt[3]{-8x^7y^{12}} = \sqrt[3]{-2^3 x^7 y^{12}} = \underline{\underline{-2x^2y^4\sqrt[3]{-x}}}$$

$$4. \ a) \ \sqrt[3]{16} \sqrt{12} = \sqrt[3]{2^4} \sqrt{2^2 \cdot 3} = \sqrt[6]{2^8} \sqrt[6]{2^6 \cdot 3^3} =$$

$$= \sqrt[6]{2^{14} \cdot 3^3} = 2^2 \sqrt[6]{2^2 \cdot 3^3} = \underline{\underline{4 \cdot \sqrt[6]{108}}}$$

$$b) \ \frac{\sqrt{a}}{\sqrt[6]{a^4}} = \frac{\sqrt[6]{a^3}}{\sqrt[6]{a^4}} = \sqrt[6]{\frac{a^3}{a^4}} = \underline{\underline{\sqrt[6]{\frac{1}{a}}}}$$

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

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

$$5. a) \sqrt[5]{\frac{x^{11}y^9}{x^6y^3}} = \sqrt[5]{x^5y^6} = \underline{\underline{xy^{\frac{6}{5}}}}$$

$$b) \frac{\sqrt{4x^4y^3} \sqrt{2x^2y^5}}{\sqrt{8x^3y^2}} = \frac{\sqrt{8x^6y^8}}{\sqrt{8x^3y^2}} = \sqrt{\frac{8x^6y^8}{8x^3y^2}} =$$

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

$$c) (\sqrt{a} - 2\sqrt{b})(3\sqrt{a} + 4\sqrt{b}) = 3(\sqrt{a})^2 + 4\sqrt{a}\sqrt{b} - 6\sqrt{b}\sqrt{a} - 8(\sqrt{b})^2$$

$$= 3a + 4\sqrt{ab} - 6\sqrt{ab} - 8b = \underline{\underline{3a - 8b - 2\sqrt{ab}}}$$

$$6. a) \frac{\sqrt{x+2}}{\sqrt{x-2}} = \frac{\sqrt{x+2} \sqrt{x-2}}{\sqrt{x-2} \sqrt{x-2}} = \underline{\underline{\frac{\sqrt{x^2-4}}{x-2}}}$$

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

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

$$= \frac{3\sqrt{2} + 6\sqrt{3} - 2\sqrt{6} - 12}{-15} = \underline{\underline{-\frac{3\sqrt{2} + 6\sqrt{3} - 2\sqrt{6} - 12}{15}}}$$