

# RACIONALIZAR - 4 ESO

|                                                    |                                                 |                                                    |                                             |
|----------------------------------------------------|-------------------------------------------------|----------------------------------------------------|---------------------------------------------|
| 1.- $\frac{3}{\sqrt{5}}$                           | sol: $\frac{3\sqrt{5}}{5}$                      | 2.- $\frac{1}{\sqrt{2}}$                           | sol: $\frac{\sqrt{2}}{2}$                   |
| 3.- $\frac{7}{2\sqrt{7}}$                          | sol: $\frac{-\sqrt{7}}{2}$                      | 4.- $\frac{-2}{3\sqrt{5}}$                         | sol: $\frac{-2\sqrt{5}}{15}$                |
| 5.- $\frac{\sqrt{3}}{\sqrt{5}}$                    | sol: $\frac{\sqrt{15}}{5}$                      | 6.- $\frac{\sqrt{2}+3}{\sqrt{5}}$                  | sol: $\frac{\sqrt{10}+3\sqrt{5}}{5}$        |
| 7.- $\frac{1+\sqrt{5}}{\sqrt{5}}$                  | sol: $\frac{\sqrt{5}+5}{5}$                     | 8.- $\frac{\sqrt{3}-\sqrt{7}}{\sqrt{7}}$           | sol: $\frac{\sqrt{21}-7}{7}$                |
| 9.- $\frac{2+\sqrt{5}}{3\sqrt{5}}$                 | sol: $\frac{2\sqrt{5}+5}{15}$                   | 10.- $\frac{\sqrt{5}+\sqrt{7}}{5\sqrt{7}}$         | sol: $\frac{\sqrt{35}+7}{35}$               |
| 11.- $\frac{3x}{\sqrt{7}}$                         | sol: $\frac{3\sqrt{7}x}{7}$                     | 12.- $\frac{3x^2+2}{3\sqrt{7}}$                    | sol: $\frac{3\sqrt{7}x^2+2\sqrt{7}}{21}$    |
| 13.- $\frac{3}{\sqrt[3]{5}}$                       | sol: $\frac{3\sqrt[3]{25}}{5}$                  | 14.- $\frac{7}{2\sqrt[3]{5^2}}$                    | sol: $\frac{7\sqrt[3]{5}}{10}$              |
| 15.- $\frac{7\sqrt[7]{5^2}}{2\sqrt[7]{5^4}}$       | sol: $\frac{7\sqrt[7]{5^5}}{10}$                | 16.- $\frac{2}{\sqrt[4]{2x^2y^3}}$                 | sol: $\frac{\sqrt[4]{2^3x^2y}}{xy}$         |
| 17.- $\frac{\sqrt{2}}{\sqrt{3}-\sqrt{2}}$          | sol: $\sqrt{6} + 2$                             | 18.- $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ | sol: $5 - 2\sqrt{6}$                        |
| 19.- $\frac{1+\sqrt{3}}{1-\sqrt{3}}$               | sol: $-2 + \sqrt{3}$                            | 20.- $\frac{-5}{5+\sqrt{5}}$                       | sol: $\frac{5-\sqrt{5}}{-4}$                |
| 21.- $\frac{2-\sqrt{3}}{2+\sqrt{3}}$               | sol: $-7 + 4\sqrt{3}$                           | 22.- $\frac{2}{\sqrt{3}+1}$                        | sol: $\sqrt{3} - 1$                         |
| 23.- $\frac{1}{2+\sqrt{3}}$                        | sol: $2 - \sqrt{3}$                             | 24.- $\frac{\sqrt{2}}{\sqrt{3}+\sqrt{2}}$          | sol: $\sqrt{6} - 2$                         |
| 25.- $\frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}}$ | sol: $-5 - 2\sqrt{6}$                           | 26.- $\frac{2\sqrt{3}}{2-\sqrt{3}}$                | sol: $6 + 4\sqrt{3}$                        |
| 27.- $\frac{\sqrt{2}-\sqrt{3}}{2+\sqrt{2}}$        | sol: $\frac{2\sqrt{2}-2\sqrt{3}+\sqrt{6}-2}{2}$ | 28.- $\frac{1+\sqrt{5}}{1-\sqrt{2}}$               | sol: $-1 - \sqrt{2} - \sqrt{5} - \sqrt{10}$ |
| 29.- $\frac{2\sqrt{3}}{\sqrt{2}+\sqrt{3}}$         | sol: $6 - 2\sqrt{6}$                            | 30.- $\frac{\sqrt{3}}{\sqrt{3}-\sqrt{2}}$          | sol: $3 + \sqrt{6}$                         |

## SOLUCIONES CON PROCEDIMIENTO:

$$1) \frac{3}{\sqrt{5}} = \frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$$

$$2) \frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$3) \frac{7}{2\sqrt{7}} = \frac{7}{2\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{7\sqrt{7}}{2 \cdot 7} = -\frac{\sqrt{7}}{2}$$

$$4) \frac{-2}{3\sqrt{5}} = \frac{-2}{3\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{-2\sqrt{5}}{3 \cdot 5} = -\frac{2\sqrt{5}}{15}$$

$$5) \frac{\sqrt{3}}{\sqrt{5}} = \frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{15}}{5}$$

$$6) \frac{\sqrt{2}+3}{\sqrt{5}} = \frac{\sqrt{2}+3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{10}+3\sqrt{5}}{5}$$

$$7) \frac{1+\sqrt{5}}{\sqrt{5}} = \frac{1+\sqrt{5}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}+5}{5}$$

$$8) \frac{\sqrt{3}-\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{3}-\sqrt{7}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{21}-7}{7}$$

$$9) \frac{2+\sqrt{5}}{3\sqrt{5}} = \frac{2+\sqrt{5}}{3\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}+5}{15}$$

$$10) \frac{\sqrt{5}+\sqrt{7}}{5\sqrt{7}} = \frac{\sqrt{5}+\sqrt{7}}{5\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{35}+7}{35}$$

$$11) \frac{3x}{\sqrt{7}} = \frac{3x}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}x}{7}$$

$$12) \frac{3x^2+2}{3\sqrt{7}} = \frac{3x^2+2}{3\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}x^2+2\sqrt{7}}{21}$$

$$13) \frac{3}{\sqrt[3]{5}} = \frac{3}{\sqrt[3]{5}} \cdot \frac{\sqrt[3]{5^2}}{\sqrt[3]{5^2}} = \frac{3\sqrt[3]{25}}{5}$$

$$14) \frac{7}{2\sqrt[3]{5^2}} = \frac{7\sqrt[3]{5}}{2\sqrt[3]{5^2} \cdot \sqrt[3]{5}} = \frac{7\sqrt[3]{5}}{10}$$

$$15) \frac{7\sqrt[7]{5^2}}{2\sqrt[7]{5^4}} = \frac{7\sqrt[7]{5^2}}{2\sqrt[7]{5^4}} \cdot \frac{\sqrt[7]{5^3}}{\sqrt[7]{5^3}} = \frac{7\sqrt[7]{5^5}}{10}$$

$$16) \frac{2}{\sqrt[4]{2x^2y^3}} = \frac{2}{\sqrt[4]{2x^2y^3}} \cdot \frac{\sqrt[4]{2^3x^2y}}{\sqrt[4]{2^3x^2y}} = \frac{\sqrt[4]{2^3x^2y}}{xy}$$

$$17) \frac{\sqrt{2}}{\sqrt{3}-\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{3}-\sqrt{2}} \cdot \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{6}+2}{3-2} = \sqrt{6}+2$$

$$18) \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} \cdot \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}} = \frac{(\sqrt{3})^2 - 2\sqrt{2} \cdot \sqrt{3} + (\sqrt{2})^2}{3-2} =$$

$$= \frac{3-2\sqrt{6}+2}{1} = 5-2\sqrt{6}$$

$$19) \frac{1+\sqrt{3}}{1-\sqrt{3}} = \frac{1+\sqrt{3}}{1-\sqrt{3}} \cdot \frac{1+\sqrt{3}}{1+\sqrt{3}} = \frac{1+2\sqrt{3}+3}{1-3} = \frac{4+2\sqrt{3}}{-2} = -2-\sqrt{3}$$

$$20) \frac{-5}{5+\sqrt{5}} = \frac{-5}{5+\sqrt{5}} \cdot \frac{5-\sqrt{5}}{5-\sqrt{5}} = \frac{-25+5\sqrt{5}}{25-5} = \frac{-25}{20} + \frac{5\sqrt{5}}{20} = -\frac{5}{4} + \frac{\sqrt{5}}{4}$$

$$21) \frac{2-\sqrt{3}}{2+\sqrt{3}} = \frac{2-\sqrt{3}}{2+\sqrt{3}} \cdot \frac{2-\sqrt{3}}{2-\sqrt{3}} = \frac{4-4\sqrt{3}+3}{2-3} = \frac{7-4\sqrt{3}}{-1} = 4\sqrt{3}-7$$

$$22) \frac{2}{\sqrt{3}+1} = \frac{2}{\sqrt{3}+1} \cdot \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{2\sqrt{3}-2}{3-1} = \sqrt{3}-1$$

$$23) \frac{1}{2+\sqrt{3}} = \frac{1}{2+\sqrt{3}} \cdot \frac{2-\sqrt{3}}{2-\sqrt{3}} = \frac{2-\sqrt{3}}{4-3} = 2-\sqrt{3}$$

$$24) \frac{\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{3}+\sqrt{2}} \cdot \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}} = \frac{\sqrt{6}-2}{3-2} = \sqrt{6}-2$$

$$25) \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}} = \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}} \cdot \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}+\sqrt{3}} = \frac{2+2\sqrt{6}+3}{2-3} = -5-2\sqrt{6}$$

$$26) \frac{2\sqrt{3}}{2-\sqrt{3}} = \frac{2\sqrt{3}}{2-\sqrt{3}} \cdot \frac{2+\sqrt{3}}{2+\sqrt{3}} = \frac{4\sqrt{3}+2\cdot 3}{4-3} = 6+4\sqrt{3}$$

$$27) \frac{\sqrt{2}-\sqrt{3}}{2+\sqrt{2}} = \frac{\sqrt{2}-\sqrt{3}}{2+\sqrt{2}} \cdot \frac{2-\sqrt{2}}{2-\sqrt{2}} = \frac{2\sqrt{2}-2\sqrt{3}-2+\sqrt{6}}{4-2} = \frac{2\sqrt{2}-2\sqrt{3}-2+\sqrt{6}}{2}$$

$$28) \frac{1+\sqrt{5}}{1-\sqrt{2}} = \frac{1+\sqrt{5}}{1-\sqrt{2}} \cdot \frac{1+\sqrt{2}}{1+\sqrt{2}} = \frac{1+\sqrt{2}+\sqrt{5}+\sqrt{10}}{1-2} = -1-\sqrt{2}-\sqrt{5}-\sqrt{10}$$

$$29) \frac{2\sqrt{3}}{\sqrt{2}+\sqrt{3}} = \frac{2\sqrt{3}}{\sqrt{2}+\sqrt{3}} \cdot \frac{\sqrt{2}-\sqrt{3}}{\sqrt{2}-\sqrt{3}} = \frac{2\sqrt{6}-6}{2-3} = 6-2\sqrt{6}$$

$$30) \frac{\sqrt{3}}{\sqrt{3}-\sqrt{2}} = \frac{\sqrt{3}}{\sqrt{3}-\sqrt{2}} \cdot \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{3+\sqrt{6}}{3-2} = 3+\sqrt{6}$$