



## POTENCIAS

| PROPIEDADES |         |                           |                       |                           |                                 |                       |                          |                                        |  |
|-------------|---------|---------------------------|-----------------------|---------------------------|---------------------------------|-----------------------|--------------------------|----------------------------------------|--|
| $A^0=1$     | $A^1=a$ | $A^m \cdot a^n = a^{m+n}$ | $A^m : a^n = a^{m-n}$ | $(A^m)^n = a^{m \cdot n}$ | $(a \cdot b)^2 = a^2 \cdot b^2$ | $(a:b)^2 = a^2 : b^2$ | $A^{-n} = \frac{1}{a^n}$ | $(\frac{a}{b})^{-n} = (\frac{b}{a})^n$ |  |
| $2^0=1$     | $2^1=2$ | $2^2 \cdot 2^5 = 2^{2+5}$ | $2^2 : 2^5 = 2^{2-5}$ | $(2^2)^5 = 2^{2 \cdot 5}$ | $(2 \cdot 4)^2 = 2^2 \cdot 4^2$ | $(4:2)^2 = 4^2 : 2^2$ | $5^{-2} = \frac{1}{5^2}$ | $(\frac{3}{5})^{-2} = (\frac{5}{3})^2$ |  |

| PROPIEDADES DE POTENCIAS                                                                                           |                                                                                                               | NIVEL 1                                                                                                                                                 |                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $a^0 = 1$                                                                                                          | $a^n \cdot a^m = a^{n+m}$                                                                                     | a) $(+2)^5 =$                                                                                                                                           | a) $(-2)^4 =$                                                                                                                                                         |
| $a^1 = a$                                                                                                          | $a^n : a^m = a^{n-m}$                                                                                         | b) $(-2)^6 =$                                                                                                                                           | b) $-2^4 =$                                                                                                                                                           |
| $a^{-n} = \frac{1}{a^n}$                                                                                           | $(a \cdot b)^n = a^n \cdot b^n$                                                                               | c) $(-5)^3 =$                                                                                                                                           | c) $(+2)^4 =$                                                                                                                                                         |
| $(a^n)^m = a^{n \cdot m}$                                                                                          | $(a:b)^n = a^n : b^n$                                                                                         | d) $(+3)^4 =$                                                                                                                                           | d) $(-2)^3 =$                                                                                                                                                         |
|                                                                                                                    |                                                                                                               | e) $(-3)^4 =$                                                                                                                                           | e) $-2^3 =$                                                                                                                                                           |
|                                                                                                                    |                                                                                                               | f) $(+6)^2 =$                                                                                                                                           | f) $(+2)^3 =$                                                                                                                                                         |
|                                                                                                                    |                                                                                                               | g) $(+10)^5 =$                                                                                                                                          | g) $(-5)^2 =$                                                                                                                                                         |
|                                                                                                                    |                                                                                                               | h) $(-10)^5 =$                                                                                                                                          | h) $-5^2 =$                                                                                                                                                           |
|                                                                                                                    |                                                                                                               | a) $(-1)^{28} =$                                                                                                                                        | i) $(+5)^2 =$                                                                                                                                                         |
|                                                                                                                    |                                                                                                               | b) $(-1)^{29} =$                                                                                                                                        | j) $(-3)^3 =$                                                                                                                                                         |
|                                                                                                                    |                                                                                                               | c) $(-1)^{30} =$                                                                                                                                        | k) $-3^3 =$                                                                                                                                                           |
|                                                                                                                    |                                                                                                               | d) $(-1)^{31} =$                                                                                                                                        | l) $(+3)^3 =$                                                                                                                                                         |
| NIVEL 2                                                                                                            |                                                                                                               | NIVEL 3                                                                                                                                                 |                                                                                                                                                                       |
| a) $(-2)^5 \cdot (+5)^5 =$                                                                                         | a) $(-4)^8 : (-4)^5 =$                                                                                        | $[2^9 : (2^3)^2] \cdot (-2)^4$                                                                                                                          |                                                                                                                                                                       |
| b) $(+4)^3 \cdot (-5)^3 =$                                                                                         | b) $(+6)^7 : (+6)^5 =$                                                                                        | $(-5^2)^4 : [5^3 \cdot (-5)^3]$                                                                                                                         |                                                                                                                                                                       |
| c) $(-6)^4 : (+3)^4 =$                                                                                             | c) $(+3)^{10} : (-3)^6 =$                                                                                     | $[x^8 \cdot (-x)^5] : x^3$                                                                                                                              |                                                                                                                                                                       |
| d) $(-5)^7 : (+5)^7 =$                                                                                             | d) $(-8)^5 : (+8)^3 =$                                                                                        | $-m^4 \cdot [(m^3)^5 : (-m)^8]$                                                                                                                         |                                                                                                                                                                       |
| e) $(-15)^4 : (-5)^4 =$                                                                                            | e) $(-15)^4 : (+15)^4 =$                                                                                      |                                                                                                                                                         |                                                                                                                                                                       |
| f) $(+32)^5 : (-16)^5 =$                                                                                           | f) $(+12)^3 : (-12)^2 =$                                                                                      |                                                                                                                                                         |                                                                                                                                                                       |
| NIVEL 4                                                                                                            |                                                                                                               | NIVEL 5                                                                                                                                                 |                                                                                                                                                                       |
| a) $\frac{2^7 \cdot 2^5 \cdot 2^3 \cdot 2^0}{2 \cdot 2^3 \cdot 2^5 \cdot 2^6} =$                                   | h) $\frac{2^2 \cdot (2^3 : 2^4)^{-5} : 2^{-3}}{2^3 \cdot (2^{-2})^{-3}} =$                                    | p) $\frac{(3^2)^3 \cdot 3^{-2} \cdot (2^{-2})^3 \cdot (2^2)^{-3}}{18 \cdot (3^{-1})^{-2} \cdot 2^{-7} \cdot (2^2)^{-3}} =$                              | a) $\frac{4^4 \cdot 8^{-1} \cdot 16^2}{(\frac{1}{2})^3 \cdot 8^6} =$                                                                                                  |
| b) $\frac{2^3 \cdot 2^4 \cdot 5^3 \cdot 5^{-1}}{2^{-1} \cdot 2^2 \cdot 5^{-2} \cdot 5^{-3}} =$                     | i) $\frac{15^2 \cdot 5^{-2} \cdot 5^3 \cdot 45^2}{(5^3)^2 \cdot 27 \cdot 3^{-2}} =$                           | q) $\frac{(6a^{-3}b^2)^{-3}}{(2ab)^{-4}} =$                                                                                                             | b) $\frac{(-3)^2 \cdot (-\frac{1}{3})^2 \cdot (\frac{1}{3})^{-2} \cdot (\frac{2}{3})^2}{(-3)^3 \cdot 3^{-4} \cdot (-3)^3 \cdot (\frac{1}{3})^4} =$                    |
| c) $\frac{3^{-2} \cdot 7^2 \cdot 3 \cdot 7^{-4} \cdot 3^5}{7^3 \cdot 3^{-1} \cdot 7^{-5} \cdot 3^4} =$             | j) $\frac{2^{-1} \cdot (2^3)^5 \cdot 4 \cdot 5^3}{100 \cdot 2^{-2} \cdot 8} =$                                | r) $\frac{6^5 \cdot 2^3 \cdot (2^4 \cdot 3^{-2})^{-2}}{2^2 \cdot 3^5} =$                                                                                | c) $\frac{(-\frac{5}{4})^3 \cdot (\frac{2}{5})^2 \cdot (\frac{2}{25})^{-2}}{(\frac{4}{5})^3 \cdot (-\frac{5}{2})^{-1} \cdot (-25)^2 \cdot ((\frac{5}{2})^{4+3})^3} =$ |
| d) $\frac{3^8 \cdot 7^{-1} \cdot 5^2 \cdot 7^3 \cdot 3^{-2}}{7^4 \cdot 5^{-1} \cdot 3^5 \cdot 5^3 \cdot 7^{-2}} =$ | k) $\frac{3^2 : (2 : 3^3)^2}{2 : (3 \cdot 2^2)^{-2}} =$                                                       | s) $\frac{4^3 \cdot (3^{-2})^{-3} \cdot 27^3 \cdot 32^2 \cdot (36^2)^{-2}}{8^2 \cdot (2^6)^2 \cdot (9^{-3})^5 \cdot 24^{-3} \cdot [(3^{-2})^2]^{-5}} =$ | d) $\frac{3^3 \cdot 5^2}{\frac{2^{-1}}{3^2 \cdot 5} \cdot \frac{2^2}{3 \cdot 5}} =$                                                                                   |
| e) $\frac{2^3 \cdot 4^5 \cdot 2^6 \cdot 2 \cdot 8^{30}}{16 \cdot 2^3 \cdot 32 \cdot 2^4} =$                        | l) $\frac{2^3 \cdot 8^{-3} \cdot 12^{-1} \cdot (-3)^2}{6^2 \cdot 16^{-2} \cdot 3^{-3}} =$                     | s) $\frac{4^3 \cdot (3^{-2})^{-3} \cdot 27^3 \cdot 32^2 \cdot (36^2)^{-2}}{8^2 \cdot (2^6)^2 \cdot (9^{-3})^5 \cdot 24^{-3} \cdot [(3^{-2})^2]^{-5}} =$ | e) $\frac{3^3 \cdot (\frac{3}{2})^2 \cdot (-2)^3}{3^{-1} \cdot (\frac{4}{9})^{-4} \cdot (\frac{3}{2})^{-1} \cdot 12} =$                                               |
| f) $\frac{15^2 \cdot 3^2 \cdot 5^3 \cdot 45^2}{25 \cdot 5^3 \cdot 125 \cdot 27} =$                                 | m) $\frac{2^2 (2^3 : 2^4)^{-5} : 2^{-3}}{2^3 (2^{-2})^{-3}} =$                                                | t) $\frac{(-x^2y)^5 (-y^4)^{-3}}{(-y)^2 (-x)^3 (-y)^6} =$                                                                                               | f) $\frac{(\frac{3}{5})^2 \cdot (\frac{3}{5})^2 \cdot (\frac{3}{5})^2 \cdot (\frac{3}{5})^4}{(\frac{9}{5})^3 \cdot [(3^2)^2]^{-1} \cdot 15^3} =$                      |
| g) $\frac{6 \cdot 12^3 \cdot 18^2 \cdot 3^2 \cdot 108^2}{27^2 \cdot 3^2 \cdot 16 \cdot 48 \cdot 36} =$             | n) $\frac{6^4 \cdot 9^2 \cdot 2^4 \cdot 3^{-5} \cdot 2^{-1}}{18^3 \cdot 2^{-5} \cdot 3^6 \cdot (3^3)^{-3}} =$ | u) $\frac{2^3 \cdot (3^{-2})^{-3} \cdot (-8)^{-2} \cdot (6^2)^{-4}}{[(-9)^{-2}]^3 \cdot 16^{-1} \cdot 4^{-3} \cdot [(-3)^{-2}]^{-3}} =$                 | j) $\frac{[(\frac{2}{5})^2]^{-2} \cdot (\frac{2}{5})^3 \cdot (\frac{25}{4})^4}{(\frac{2}{5})^3 \cdot (-\frac{5}{2})^{-3} \cdot (-5)^2 \cdot (-\frac{1}{2})^6} =$      |

