

Calcula las siguientes potencias

1) a) $2^5 = 32$; b) $(-2)^5 = -32$; c) $-2^5 = -32$; d) $-2^{-5} = -\frac{1}{32}$

e) $(-2)^{-5} = -\frac{1}{32}$; f) $2^{-5} = \frac{1}{32}$; g) $2^{\frac{1}{5}} = \sqrt[5]{2}$; h) $5^{(-2)} = \frac{1}{25}$

i) $5^{-\frac{1}{2}} = \frac{1}{5^{\frac{1}{2}}} = \left(\frac{1}{5}\right)^{\frac{1}{2}} = \sqrt{\frac{1}{5}} = \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$; l) $\left(-\frac{1}{5}\right)^{-\frac{1}{2}} = (-5)^{\frac{1}{2}} = \sqrt{-5}$

j) $5^{\frac{1}{2}} = \sqrt{5}$;

k) $\left(\frac{1}{5}\right)^{\frac{1}{2}} = \frac{1}{\sqrt{5}}$

2) a) $\left\{ \left[(0,01)^2 \right]^3 \right\}^4 = \left\{ \left[\left(\frac{1}{10^2} \right)^2 \right]^3 \right\}^4 = \left(\frac{1}{10^2} \right)^{24} = \frac{1}{10^{48}} = \left(\frac{1}{10} \right)^{48} = \sqrt{-5} = \cancel{\sqrt{-5}}$

Reduce a una sola potencia

b) $(-5,987)^{15} : (-5,987)^{15} = 1$

c) $\left[\left(-\frac{1}{4} \right)^3 \cdot \frac{8}{7} \cdot (-14) \right]^4 = \left[\left(-\frac{1}{2^2} \right)^3 \cdot \frac{2^3}{7} \cdot (-1)2 \cdot 7 \right]^4 = \left(\frac{+1}{2^6} \cdot \frac{2^3}{7} \cdot 2 \cdot 7 \right)^4 = \left(\frac{1}{2^6} \cdot \frac{2^3}{7} \cdot 2 \cdot 7 \right)^4 = \frac{1}{2^8} = \frac{1}{256}$

3) a) $(4^2)^6 = 4^{12} = (2^2)^{12} = 2^{24}$ b) $(-3^5)^6 = (-3)^{30} = 3^{30}$

c) $(9^{\frac{1}{2}})^6 = 9^{3} = 729$ d) $\left(\left(\frac{4}{27} \right)^3 \right)^{-1} = \left(\left(\frac{2^2}{3^3} \right)^3 \right)^{-1} = \left(\frac{2^6}{3^9} \right)^{-1} = \frac{3^9}{2^6} = 3^3 \cdot \frac{1}{2^6} = \frac{27}{64}$

Simplifica y expresa en forma de potencia

e) $\left(\left(-\frac{1}{2} \right)^{-4} \right)^{-1} = \left((-2)^4 \right)^{-1} = (-2)^{-4} = \frac{1}{(-2)^4} = \left(\frac{1}{2} \right)^4 = \frac{1}{16}$

f) $\left((\sqrt{2})^7 \right)^3 = (\sqrt{2})^{21} = \sqrt{2^{21}} = 2^{\frac{21}{2}}$

g) $\left((a)^{\frac{1}{2}} \right)^{-4} = a^{-\frac{4}{2}} = a^{-2} = \frac{1}{a^2} = \left(\frac{1}{a} \right)^2$

Calcula el valor de las siguientes potencias

4) a) $a^0 = 1$ (con $a \neq 0$) ; b) $\left(\frac{2}{9} \right)^{-1} = \frac{9}{2}$; c) $\left(\left(-\frac{4}{7} \right)^{-1} \right)^0 = 1$

d) $(3-2a)^0 = 1$ (con $a \neq \frac{3}{2}$) ; e) $1^{-1} = 1$; f) $-1^1 = -1$

g) $-1^{-1} = -1$; h) $1^{1667} = 1$

5) a) $a^{\frac{2}{3}} : a^{\frac{2}{3}} = a^0 = 1$; b) $\left\{ \left(\frac{1}{2} \right)^3 \cdot \frac{4}{9} - \frac{19}{15} \cdot \frac{5}{6} \right\}^{120} =$

$= \left(\frac{1}{2^3} \cdot \frac{2^2}{3^2} - \frac{19}{9 \cdot 6} \right)^{120} = \left(\frac{1}{18} - \frac{19}{18} \right)^{120} = \left(-\frac{18}{18} \right)^{120} = (-1)^{120} = 1$

Simplifica y expresa como potencia

$$c) \left[\frac{5^8 \cdot 3^5 \cdot 6^2}{15^7 \cdot 4^{-2}} \right] = \frac{5^8 \cdot 3^5 \cdot (3^2 \cdot 2^2) \cdot 2^4}{15^7} = \frac{5^8 \cdot 3^7 \cdot 2^6}{15^7} =$$

$$= \frac{5^8 \cdot \cancel{3^7} \cdot 2^6}{\cancel{3^7} \cdot 5^7} = 5 \cdot 2^6$$

$$d) \left[4 \cdot \frac{5}{8} \cdot \frac{6^{-2}}{15} \cdot \left(\frac{7}{12} \right)^{-2} \right] = \frac{5}{2} \cdot \frac{12^2}{7^2} \cdot \frac{1}{6^2 \cdot 3 \cdot \cancel{2}} = \frac{\cancel{3} \cdot 2^4}{2 \cdot 7^2 \cdot \cancel{2} \cdot \cancel{3} \cdot 3} =$$

$$= \frac{2}{7^2 \cdot 3} = \frac{2}{49 \cdot 3} = \frac{2}{147}$$

$$e) \left[\frac{(x^2)^{-5} \cdot y^3}{x^3 \cdot (y^5)^{-3}} \right] = \frac{x^{-10} \cdot y^3}{x^3 \cdot y^{-15}} = \frac{y^{18}}{x^{13}} = y^5 \left(\frac{y}{x} \right)^{13}$$

6) a) $320 \cdot 10^{-4} = 3,2 \cdot 10^{-2}$; b) $875 \cdot 10^{12} = 8,75 \cdot 10^{14}$

Expresa en
notación
científica

c) $4,235 \cdot 10^{-8}$ (ya está)

d) $1275 \cdot 10^{12} = 1,275 \cdot 10^{15}$

e) $7,6 \cdot 10^{-7}$ (ya está)

f) $0,0097 \cdot 10^6 = 9,7 \cdot 10^3$

Opera y expresa en notación científica.

7) a) $6,34 \cdot 10^5 + 324,5 \cdot 10^7 = 0,0634 \cdot 10^7 + 324,5 \cdot 10^7 = 324,5634 \cdot 10^7 = 3,245634 \cdot 10^9$

b) $9,23 \cdot 10^{-4} + 6,12 \cdot 10^{-3} = 0,923 \cdot 10^{-3} + 6,12 \cdot 10^{-3} = 7,043 \cdot 10^{-3}$

c) $2 \cdot 10^{-5} - 12,19 \cdot 10^{-7} = 200 \cdot 10^{-7} - 12,19 \cdot 10^{-7} = 187,81 \cdot 10^{-7} = 1,8781 \cdot 10^{-5}$

d) $387,34 \cdot 10^{-9} - 12,4 \cdot 10^{-12} = 387,34 \cdot 10^{-9} - 0,0124 \cdot 10^{-9} = 387,3276 \cdot 10^{-9} = 3,873276 \cdot 10^{-7}$

e) $(8 \cdot 10^{12}) \cdot (1,3 \cdot 10^{10}) = 8 \cdot 1,3 \cdot 10^{12} \cdot 10^{10} = 10,4 \cdot 10^{22} = 1,04 \cdot 10^{23}$

f) $(936 \cdot 10^{-14}) : (1,3 \cdot 10^{-10}) = \frac{936}{1,3} \cdot \frac{10^{-14}}{10^{-10}} = 720 \cdot 10^{-4} = 7,2 \cdot 10^{-2}$