

REPASO DE POTENCIAS

1) Calcula el valor de las siguientes potencias

$$\begin{array}{lll} \text{a)} (-3)^4 = 81 & \text{d)} 7^0 = 1 & \text{g)} (-1)^{45} = -1 \\ \text{b)} (-3)^{-3} = \left(-\frac{1}{3}\right)^3 = -\frac{1}{27} & \text{e)} (-1)^{54} = 1 & \text{h)} -5^4 = -625 \\ \text{c)} \left(-\frac{3}{2}\right)^2 = \frac{9}{4} & \text{f)} \left(\frac{2}{5}\right)^{-3} = \left(\frac{5}{2}\right)^3 = \frac{125}{8} & \text{i)} \left(-\frac{3}{4}\right)^{-3} = \left(-\frac{4}{3}\right)^3 = -\frac{64}{27} \end{array}$$

$$\begin{array}{lll} \text{j)} (-5)^4 = 625 & \text{m)} -2^{-2} = -\left(\frac{1}{2}\right)^2 = -\frac{1}{4} & \text{o)} 9^{-1} = \frac{1}{9} \\ \text{k)} (-5)^{-3} = \left(-\frac{1}{5}\right)^3 = -\frac{1}{125} & \text{n)} 0^3 = 0 & \text{p)} 8^{-2} = \left(\frac{1}{8}\right)^2 = \frac{1}{64} \\ \text{l)} \left(-\frac{2}{5}\right)^{-1} = \left(-\frac{5}{2}\right)^1 = -\frac{5}{2} & \text{ñ)} \left(-\frac{4}{7}\right)^0 = 1 & \text{q)} \left(\frac{1}{5}\right)^{-2} = 5^2 = 25 \end{array}$$

2) Aplicando las propiedades de las potencias, reduce a única potencia

$$\text{a)} (a \cdot a^2 \cdot a^3)^2 \cdot a^{-3} = (a^6)^2 \cdot a^{-3} = a^{12} \cdot a^{-3} = a^{15}$$

$$\text{b)} a^5 \cdot a^{-2} \cdot (a^{-3})^2 = a^3 \cdot a^{-6} = a^{-3} = \frac{1}{a^3}$$

$$\text{c)} (a^2 \cdot a^5)^{-3} \cdot (a^3 \cdot a^{-1})^{-2} = (a^7)^{-3} \cdot (a^2)^{-2} = a^{-21} \cdot a^{-4} = a^{-25} = \frac{1}{a^{25}}$$

$$\text{d)} \left(\frac{2}{3}\right)^4 \cdot \left[\frac{3}{2} \cdot \left(\frac{2}{3}\right)^{-5}\right]^6 = \left(\frac{2}{3}\right)^4 \cdot \left[\frac{3}{2} \cdot \frac{2^{-5}}{3}\right]^6 = \left(\frac{2}{3}\right)^4 \cdot \left[\frac{3 \cdot 2^{-5}}{2 \cdot 3}\right]^6 = \left(\frac{2}{3}\right)^4 \cdot \left(\frac{2^{-5}}{2}\right)^6 = \left(\frac{2}{3}\right)^4 \cdot 2^{-36} = \frac{2^4}{3^4} \cdot 2^{-36} = \frac{2^{-32}}{3^4}$$

$$\text{e)} 8^2 \cdot (4^3 \cdot 2^{20} \cdot 2^8)^{-5} = (2^3)^2 \cdot (2^3 \cdot 2^{20} \cdot 2^8)^{-5} = 2^6 \cdot (2^6 \cdot 2^{20} \cdot 2^8)^{-5} = 2^6 \cdot (2^{34})^{-5} = 2^6 \cdot 2^{-170} = 2^{-164} = \frac{1}{2^{164}}$$

$$\text{f)} 30^{-4} \cdot 5^{-4} = (30 \cdot 5)^{-4} = 150^{-4}$$

$$\text{g)} 15^6 \cdot 2^6 = (15 \cdot 2)^6 = 30^6$$

$$\text{h)} \frac{100 \cdot (10^6 \cdot 0.001)}{100^3} = \frac{10^2 \cdot (10^6 \cdot 10^{-3})}{(10^2)^3} = \frac{10^2 \cdot 10^3}{10^6} = \frac{10^5}{10^6} = 10^{-1} = \frac{1}{10}$$

3) Calcula

$$a) 3^{-1} + 3^{-2} + 3^{-3} + 3^{-4} = \frac{1}{3} + \left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)^3 + \left(\frac{1}{3}\right)^4 = \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} =$$
$$= \frac{27+9+3+1}{81} = \frac{40}{81}$$

$$b) \left(1 + \frac{2}{3}\right)^4 : \left(2 - \frac{1}{3}\right)^2 \cdot \left(\frac{5}{3}\right)^{-2} = \left(\frac{3+2}{3}\right)^4 : \left(\frac{6-1}{3}\right)^2 \cdot \left(\frac{5}{3}\right)^{-2} = \left(\frac{5}{3}\right)^4 : \left(\frac{5}{3}\right)^2 \cdot \left(\frac{5}{3}\right)^{-2} =$$
$$= \left(\frac{5}{3}\right)^4 = \frac{625}{81}$$

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 $4-2-(-2)$

$$c) 2^{-2} : 2^{-3} + 4^4 = 2^1 + 4^4 = 2 + 256 = 258$$

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 $-2-(-3)=-2+3$

$$d) \frac{5}{2} - \frac{3^4 \cdot 3^8}{(3^2)^6} = \frac{5}{2} - \frac{3^{12}}{3^{12}} = \frac{5}{2} - 3^0 = \frac{5}{2} - 1 = \frac{5-2}{2} = \frac{3}{2}$$

4) Expresa en notación científica

$$a) 0'000\,000\,000\,345 = 3'45 \cdot 10^{-10}$$

$$b) 0'000\,002\,536 = 2'536 \cdot 10^{-6}$$

$$c) 987\,000\,000\,000 = 9'87 \cdot 10^{11}$$

$$d) 96\,230\,000 = 9'623 \cdot 10^7$$