1. Find the value of ...

a. 3^{-2} b. 5^{-1} c. 2^{-6} d. 10^{-3} e. $\left(\frac{1}{2}\right)^{-1}$ f. $\left(\frac{1}{3}\right)^{-4}$

g. $\left(\frac{2}{5}\right)^{-3}$ h. $\left(\frac{3}{4}\right)^{-2}$ i. $0{\cdot}3^{-3}$ j. $0{\cdot}25^{-5}$ k. 2^{-a} l. 5^{-3m}

2. Find the missing values

a. $\square^{-2} = \frac{1}{16}$ b. $4^{\square} = \frac{1}{64}$ c. $2^{\square} = \frac{1}{32}$ d. $\square^{-3} = \frac{1}{343}$ e. $\square^{-4} = \frac{1}{81}$

f. $\left(\frac{2}{3}\right)^{\square} = \frac{27}{8}$ g. $\left(\frac{\square}{5}\right)^{-2} = \frac{\square}{64}$ h. $\left(\frac{5}{\square}\right)^{\square} = \frac{81}{625}$ i. $\square^{-2} = 0{\cdot}49$ j. $1{\cdot}2^{\square} = \frac{\square}{216}$

3. Write as a single power, and hence find the value of ...

a. $\frac{5^2 \times 5^3}{5^7}$ b. $\frac{2^2}{2^7 \times 2^{-3}}$ c. $\left(3^2\right)^3 \times 3^{-9}$ d. $\left(\frac{10^8}{10^5}\right)^{-2}$ e. $\frac{(2^2)^4}{2^2 \times 2^{10}}$

4. Find the value of x (Where necessary, leave your answer as a fraction in its simplest form)

a. $3^{2x} = \frac{1}{81}$ b. $10^{3x+1} = \frac{1}{100}$ c. $\left(\frac{2}{5}\right)^{5x-8} = \frac{625}{16}$ d. $\left(\frac{1}{2}\right)^2 \times \left(\frac{1}{2}\right)^{8x} = 64$ e. $2^2 \times 2^{6x} = \frac{1}{8}$

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