1. Write as a single power

a. $3^4 \times 3^5$ b. $6^7 \div 6^3$ c. $\left(4^2\right)^3$ d. $\frac{10^5}{10^4}$ e. $2^{-4} \times 2^9$ f. $\left(3^{-2}\right)^4$

g. $\left(7^{-5}\right)^{-2}$ h. $2^a \times 2^{3a}$ i. $\frac{8m}{8n}$ j. $5^{2x} \times 5^{4x}$ k. $(4g)^3$ l. $6^{3y+1} \div 6^{y-2}$

2. Find the missing values

a. $5^3 \times 5^{\square} = 5^{10}$ b. $7^{\square} \div 7^4 = 7^2$ c. $\left(4^2\right)^{\square} = 4^{-24}$ d. $9^{\square} \times 9^3 = 9^{-8}$ e. $\frac{2^6}{2^{\square}} = 2^{-4}$

f. $\left(10^{\square}\right)^{-3} = 10^{12}$ g. $3^{2a} \times 3^{\square} = 3^{7a}$ h. $\frac{6^{7m-2}}{6^{\square}} = 6^{5m+4}$ i. $\left(4^{3d}\right)^{\square} = 4^{-6d^3}$ j. $7^{4xy} \div 7^{\square} = 7$

3. Write as a single ...

a. Power of 2 $4^2 \div 2^3$ b. Power of 3 $3^2 \times 9^2$ c. Power of 5 $25^4 \times 5^3$ d. Power of 2 $16^2 \div 2^5$ e. Power of 3 $27^2 \times 3^{-2}$

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

a. $6^x \times 6^x = 6^4$ b. $2^{5x} \div 2^{3x} = 2^6$ c. $\left(5^x\right)^3 = 5^9$ d. $9^{2x} \div 9^{6x} = 9^{-20}$

e. $\left(3^{2x}\right)^2 = 3^{-4}$ f. $7^{x+1} \times 7^{x+2} = 7^7$ g. $4^{2x+7} \div 4^{x+2} = 4^3$ h. $6^{2x-1} \times 6^{5x} = 6^{48}$

i. $8^{4x+3} \times 8^{3x-5} = 8^{18}$ j. $\left(5^{2x}\right)^{3x} = 5^{24}$ k. $3^{3x} \times 3^{2x} = 3^8$ l. $2^{2x} \div 2^3 = 2^8$

m. $5^{3x} \div 5^2 = 5^{11}$ n. $2^x \times 4^x = 2^{24}$ o. $2^8 \div 8^x = 4^x$ p. $\left(9^x\right)^5 = 3^{30}$

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