1 Copy and complete to give an answer in index form. Use cancelling in parts **c** and **d**.

a $3^2 \times 3^4 = 3 \times \square\ 3 \times \square \times \square \times \square$
$= 3^{\square}$

b $6^4 \times 6^3 = 6 \times \square \times \square \times \square \times 6 \times \square \times \square$
$= 6^{\square}$

c $5^5 \div 5^3 = \dfrac{5 \times \square \times \square \times \square \times \square}{5 \times \square \times \square}$
$= 5^{\square}$

d $9^4 \div 9^2 = \dfrac{9 \times \square \times \square \times \square}{9 \times \square}$
$= 9^{\square}$

2 Decide if these statements are true or false.

a $5 \times 5 \times 5 \times 5 = 5^4$ **b** $2^6 \times 2^2 = 2^{6+2}$ **c** $7^2 \times 7^4 = 7^{4-2}$ **d** $8^4 \div 8^2 = 8^{4+2}$

3 Write the missing words or numbers in these sentences.

a When raising a term or numbers in index form to another power, _____ the indices.

b Any number (except 0) raised to the power 0 is equal to _____.

5 Copy and complete this working.

a $(4^2)^3 = 4 \times \square \times 4 \times \square \times 4 \times \square$
$= 4^{\square}$

b $(12^3)^3 = \left(12 \times \square \times \square\right) \times \left(12 \times \square \times \square\right) \times \left(12 \times \square \times \square\right)$
$= 12^{\square}$

6 Evaluate each of the following.

a 5^0 **b** 9^0 **c** $(-6)^0$ **d** $(-3)^0$

e $-(4^0)$ **f** $\left(\dfrac{3}{4}\right)^0$ **g** $\left(-\dfrac{1}{7}\right)^0$

7 Simplify, giving your answers in index form.

a $2^4 \times 2^3$ **b** $5^6 \times 5^3$ **c** $7^2 \times 7^4$ **d** $8^9 \times 8$

8 Apply the index law for power of a power to simplify each of the following. Leave your answers in index form.

a $(3^2)^3$ **b** $(4^3)^5$ **c** $(3^5)^6$ **d** $(7^5)^2$

9 Simplify each of the following by combining various index laws.

a $4 \times (4^3)^2$

b $(3^4)^2 \times 3$

c $7^8 \div (7^3)^2$

d $(4^2)^3 \div 4^5$

e $(3^6)^3 \div (3^5)^2$