RULES FOR INDICES

POWERS OF POWERS

NO CALCULATOR

Ref: G222. 1S1

A1 Find the missing index: $(a^{\square})^3 = a^{12}$	**A2** Find the missing index: $(a^4)^{\square} = a^8$	**A3** Simplify: $(a^5)^1$	**A4** Simplify: $(a^0)^3$
B1 Simplify: $(4a^7)^2$	**B2** Simplify: $(3a^2b)^4$	**B3** Simplify: $3(ab^4)^3$	**B4** Simplify: $(2a^3bc^2)^5$
C1 Simplify: $(a^4 \times a^2)^3$	**C2** Simplify: $(2a)^3 \times (3a)^2$	**C3** Simplify: $(a^3)^2 \times (a^2)^3$	**C4** Simplify: $(2a^2)^3 \times 3(a^3)^2$
D1 Simplify: $\left(\frac{x^7}{x^3}\right)^3$	**D2** Simplify: $\frac{(x^5)^4}{x^7}$	**D3** Simplify: $\frac{(x^3)^4}{(x^2)^3}$	**D4** Simplify: $\frac{(2x^5)^3}{2(x^3)^2}$
E1 Find the value of n $(a^n)^2 = a^{10}$	**E2** Find the value of n $(a^4)^n = a^{12}$	**E3** Find the value of p and q $(a^3b^p)^q = a^{15}b^{10}$	**E4** Find the value of p and q $(a^4b^7)^p = a^{12}b^q$

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A1 Find the missing index: $(a^{4})^3 = a^{12}$	**A2** Find the missing index: $(a^4)^{2} = a^8$	**A3** Simplify: $(a^5)^1 = a^5$	**A4** Simplify: $(a^0)^3 = a^0$ $= 1$
B1 Simplify: $(4a^7)^2 = 4^2 \times a^{14}$ $= 16a^{14}$	**B2** Simplify: $(3a^2b)^4 = 3^4 \times a^8 b^4$ $= 81a^8b^4$	**B3** Simplify: $3(ab^4)^3 = 3 \times a^3 b^{12}$ $= 3a^3b^{12}$	**B4** Simplify: $(2a^3bc^2)^5 = 2^5 \times a^{15} b^5 c^{10}$ $= 32a^{15}b^5c^{10}$
C1 Simplify: $(a^4 \times a^2)^3 = (a^6)^3$ $= a^{18}$	**C2** Simplify: $(2a)^3 \times (3a)^2 = 8a^3 \times 9a^2$ $= 72a^5$	**C3** Simplify: $(a^3)^2 \times (a^2)^3 = a^6 \times a^6$ $= a^{12}$	**C4** Simplify: $(2a^2)^3 \times 3(a^3)^2 = 8a^6 \times 3a^6$ $= 24a^{12}$
D1 Simplify: $\left(\frac{x^7}{x^3}\right)^3 = (x^4)^3 = x^{12}$	**D2** Simplify: $\frac{(x^5)^4}{x^7} = \frac{x^{20}}{x^7} = x^{13}$	**D3** Simplify: $\frac{(x^3)^4}{(x^2)^3} = \frac{x^{12}}{x^6} = x^6$	**D4** Simplify: $\frac{(2x^5)^3}{2(x^3)^2} = \frac{8x^{15}}{2x^6} = 4x^9$
E1 Find the value of n $(a^n)^2 = a^{10}$ $2n = 10$ $n = 5$	**E2** Find the value of n $(a^4)^n = a^{12}$ $4n = 12$ $n = 3$	**E3** Find the value of p and q 1ST 2ND $(a^3b^p)^q = a^{15}b^{10}$ $3q = 15$ → $5p = 10$ $q = 5$ → $p = 2$	**E4** Find the value of p and q $(a^4b^7)^p = a^{12}b^q$ 1ST $4p = 12$ 2ND $p = 3$ $q = 7p$ $= 7 \times 3$ $= 21$

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