

GCSE –Numeracy and Mathematics**Topic: Indices including zero, positive and negative, whole numbers and positive fractional****Tier: Intermediate****Grade: C/B****Starter**

Calculate the following:

(a) $2^4 =$

(b) $5^3 =$

(c) $9^2 =$

Top Tips!**Multiplying Indices:** $a^b \times a^c = a^{b+c}$ e.e. $2^4 \times 2^2 = 2^6$ **Dividing Indices:** $a^b \div a^c = a^{b-c}$ e.e. $4^5 \div 4^3 = 4^2$ **Power of zero:** $a^0 = 1$ e.e. $13^0 = 1$ **Fractional Indices:** $a^{\frac{b}{c}} = (\sqrt[c]{a})^b$ e.e. $64^{\frac{2}{3}} = (\sqrt[3]{64})^2 = 4^2 = 16$ **Skills practice:**

Simplify each of the following, giving your answer in index form:

$2^9 \times 2^{13} =$

$7^2 \times 7^{21} =$

$13^7 \times 13^{34} =$

$8^3 \times 8^{16} =$

$5^9 \div 5^4 =$

$17^{46} \div 17^{21} =$

$6^7 \div 6^2 =$

$4^{65} \div 4^{11} =$

$5^0 =$

$11^0 =$

$3^0 =$

$512^0 =$

$36^{\frac{1}{2}} =$

$27^{\frac{2}{3}} =$

$16^{\frac{3}{4}} =$

$64^{\frac{1}{2}} =$

Assessment for Learning**Video / QR code**



Starter

Calculate the following:

(a) $2^4 = 16$

(b) $5^3 = 125$

(c) $9^2 = 81$

Top Tips!

Multiplying Indices: $a^b \times a^c = a^{b+c}$ e.e. $2^4 \times 2^2 = 2^6$

Dividing Indices: $a^b \div a^c = a^{b-c}$ e.e. $4^5 \div 4^3 = 4^2$

Power of zero: $a^0 = 1$ e.e. $13^0 = 1$

Fractional Indices: $a^{\frac{b}{c}} = (\sqrt[c]{a})^b$ e.e. $64^{\frac{2}{3}} = (\sqrt[3]{64})^2 = 4^2 = 16$

Examination Question:

Simplify each of the following, giving your answer in index form:

$$2^9 \times 2^{13} = 2^{22}$$

$$7^2 \times 7^{21} = 7^{23}$$

$$13^7 \times 13^{34} = 13^{41}$$

$$8^3 \times 8^{16} = 8^{19}$$

$$5^9 \div 5^4 = 5^5$$

$$17^{46} \div 17^{21} = 17^{25}$$

$$6^7 \div 6^2 = 6^5$$

$$4^{65} \div 4^{11} = 4^{54}$$

$$5^0 = 1$$

$$11^0 = 1$$

$$3^0 = 1$$

$$512^0 = 1$$

$$36^{\frac{1}{2}} = \sqrt{36} = 6$$

$$27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$$

$$16^{\frac{3}{4}} = (\sqrt[4]{16})^3 = 2^3 = 8$$

$$64^{\frac{1}{2}} = \sqrt{64} = 8$$

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