**Basic Laws of Indices GREEN**

1. Write each of the following using index notation:

 a. $4×4×4×4×4$ b. $7×7×7×7$

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 c. $a×a×a×a$ d. $f×f×g×g×g$

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2. Work out the value of each of the following:

 a. $3^{2}$ b. $2^{5}$ c. $10^{3}$

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 d. $5^{1}$ e. $4^{0}$ f. $1^{5}$

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3. Simplify the following expressions, giving your answer in index notation:

 a. $3^{6}×3^{7}$ b. $2^{4}×2^{5}$ c. $m^{3}×m^{6}$

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 d. $4×4^{3}$ e. $3^{8}÷3^{3}$ f. $h^{4}÷h^{2}$

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 g. $\left(6^{3}\right)^{4}$ h. $b^{3}×b^{2}×b^{5}$ i. $\left(9^{4}\right)^{0}$

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 j. $\frac{8^{12}}{8^{8}}$ k. $\frac{y^{5}}{y}$ l. $\frac{r^{4}×r^{3}}{r^{5}}$

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4. Simplify the following expressions, giving your answer in index notation:

 a. $3^{-1}$ b. $4^{-2}$ c. $f^{-4}$

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 d. $5^{-3}$ e. $g^{5}÷g^{7}$ f. $y^{4}×y^{-3}$

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5. Fill in the missing numbers:

 a. $4=2^{?}$ b. $27=3^{?}$ c. $125=?^{3}$

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 d. $1=3^{?}$ e. $10 000=10^{?}$ f. $64=?^{3}$

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6. Fill in the missing numbers:

 a. $\left(2^{?}\right)^{3}=2^{12}$ b. $\left(3^{2}\right)^{5}=?^{10}$ c. $\left(10^{5}\right)^{?}=10^{15}$

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7. Simplify each of the following, giving your answer in its simplest form:

 a. $3^{2}×3^{0}×3^{4}$ b. $2^{6}×2^{7}×2$

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 c. $\frac{7^{2}×7^{4}}{7^{6}}$ d. $\frac{2^{3}×2^{4}}{2^{8}×2}$

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8. Simplify each of the following, giving your answer in its simplest form:

 a. $2a^{3}×5a^{4}$ b. $3y^{2}×4y^{-2}$

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 c. $\frac{7g^{3}×2g^{2}}{g^{4}}$ d. $\frac{6r^{3}×4r^{4}}{2r^{2}×3r}$

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 e. $\frac{4d^{5}×5d^{2}}{2d^{8}}$ f. $\frac{3c^{2}×4c^{5}}{c^{7}}$

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**Basic Laws of Indices AMBER**

1. Write each of the following using index notation:

The power or index tells you how many times the number has been multiplied by itself.

 a. $4×4×4×4×4$ b. $7×7×7×7$

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 c. $a×a×a×a$ d. $f×f×g×g×g$

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2. Work out the value of each of the following:

 a. $3^{2}$ b. $2^{5}$ c. $10^{3}$

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 d. $5^{1}$ e. $4^{0}$ f. $1^{5}$

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3. Simplify the following expressions, giving your answer in index notation:

$a^{m}×a^{n}=a^{m+n}$

$a^{m}÷a^{n}=a^{m-n}$

$a^{0}=1$

$a^{-1}=\frac{1}{a}$

 a. $3^{6}×3^{7}$ b. $2^{4}×2^{5}$ c. $m^{3}×m^{6}$

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 d. $4×4^{3}$ e. $3^{8}÷3^{3}$ f. $h^{4}÷h^{2}$

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 g. $\left(6^{3}\right)^{4}$ h. $b^{3}×b^{2}×b^{5}$ i. $\left(9^{4}\right)^{0}$

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 j. $\frac{8^{12}}{8^{8}}$ k. $\frac{y^{5}}{y}$ l. $\frac{r^{4}×r^{3}}{r^{5}}$

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4. Simplify the following expressions, giving your answer in index notation:

 a. $3^{-1}$ b. $4^{-2}$ c. $f^{-4}$

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 d. $5^{-3}$ e. $g^{5}÷g^{7}$ f. $y^{4}×y^{-3}$

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5. Fill in the missing numbers:

 a. $4=2^{?}$ b. $27=3^{?}$ c. $125=?^{3}$

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 d. $1=3^{?}$ e. $10 000=10^{?}$ f. $64=?^{3}$

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6. Fill in the missing numbers:

 a. $\left(2^{?}\right)^{3}=2^{12}$ b. $\left(3^{2}\right)^{5}=?^{10}$ c. $\left(10^{5}\right)^{?}=10^{15}$

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7. Simplify each of the following, giving your answer in its simplest form:

 a. $3^{2}×3^{0}×3^{4}$ b. $2^{6}×2^{7}×2$

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 c. $\frac{7^{2}×7^{4}}{7^{6}}$ d. $\frac{2^{3}×2^{4}}{2^{8}×2}$

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8. Simplify each of the following, giving your answer in its simplest form:

Calculate with the numbers, then calculate with the indices separately.

 a. $2a^{3}×5a^{4}$ b. $3y^{2}×4y^{-2}$

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 c. $\frac{7g^{3}×2g^{2}}{g^{4}}$ d. $\frac{6r^{3}×4r^{4}}{2r^{2}×3r}$

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 e. $\frac{4d^{5}×5d^{2}}{2d^{8}}$ f. $\frac{3c^{2}×4c^{5}}{c^{7}}$

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**Basic Laws of Indices RED**

1. Write each of the following using index notation:

The power or index tells you how many times the number has been multiplied by itself.

 a. $4×4×4×4×4$ b. $7×7×7×7$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 c. $a×a×a×a$ d. $f×f×g×g×g$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

2. Work out the value of each of the following:

 a. $3^{2}$ b. $2^{5}$ c. $10^{3}$

 $=3×3=$\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 d. $5^{1}$ e. $4^{0}$ f. $1^{5}$

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3. Simplify the following expressions, giving your answer in index notation:

$a^{m}×a^{n}=a^{m+n}$

$a^{m}÷a^{n}=a^{m-n}$

$a^{0}=1$

$a^{-1}=\frac{1}{a}$

 a. $3^{6}×3^{7}$ b. $2^{4}×2^{5}$ c. $m^{3}×m^{6}$

 $=3^{6+7}=$\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 d. $4×4^{3}$ e. $3^{8}÷3^{3}$ f. $h^{4}÷h^{2}$

 \_\_\_\_\_\_\_\_\_\_ $=3^{8-3}=$\_\_\_ \_\_\_\_\_\_\_\_\_\_

 g. $\left(6^{3}\right)^{4}$ h. $b^{3}×b^{2}×b^{5}$ i. $\left(9^{4}\right)^{0}$

 $=6^{3×4}=$\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 j. $\frac{8^{12}}{8^{8}}$ k. $\frac{y^{5}}{y}$ l. $\frac{r^{4}×r^{3}}{r^{5}}$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

4. Simplify the following expressions, giving your answer in index notation:

 a. $3^{-1}$ b. $4^{-2}$ c. $f^{-4}$

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 d. $5^{-3}$ e. $g^{5}÷g^{7}$ f. $y^{4}×y^{-3}$

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5. Fill in the missing numbers:

 a. $4=2^{?}$ b. $27=3^{?}$ c. $125=?^{3}$

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 d. $1=3^{?}$ e. $10 000=10^{?}$ f. $64=?^{3}$

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6. Fill in the missing numbers:

 a. $\left(2^{?}\right)^{3}=2^{12}$ b. $\left(3^{2}\right)^{5}=?^{10}$ c. $\left(10^{5}\right)^{?}=10^{15}$

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7. Simplify each of the following, giving your answer in its simplest form:

 a. $3^{2}×3^{0}×3^{4}$ b. $2^{6}×2^{7}×2$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 c. $\frac{7^{2}×7^{4}}{7^{6}}$ d. $\frac{2^{3}×2^{4}}{2^{8}×2}$

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8. Simplify each of the following, giving your answer in its simplest form:

Calculate with the numbers, then calculate with the indices separately.

 a. $2a^{3}×5a^{4}$ b. $3y^{2}×4y^{-2}$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 c. $\frac{7g^{3}×2g^{2}}{g^{4}}$ d. $\frac{6r^{3}×4r^{4}}{2r^{2}×3r}$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

 e. $\frac{4d^{5}×5d^{2}}{2d^{8}}$ f. $\frac{3c^{2}×4c^{5}}{c^{7}}$

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_