

## Year 8 Index Laws with Numerical Bases

### Question 1 – Multiplying/Dividing Indices (Numerical Bases)

Simplify the following:

a. $3^3 \times 3^4$	b. $4^2 \times 4^9$
c. $11^5 \times 11^6$	d. $8^9 \times 8$
e. $2^8 \div 2^4$	f. $13^3 \div 13^2$
g. $\frac{5^{12}}{5^7}$	h. $\frac{6^8}{6^2}$
i. $5^3 \times 5^4 \times 5^5$	j. $\left(\frac{1}{2}\right)^2 \times 0.5^5$
k. $7^3 2^4 \times 2^6 7^5$	l. $4^7 9^5 \div 4^6 9^3$

**Question 2 – Power of a Power (Numerical Bases)**

Simplify the following:

a. $(2^4)^2$	b. $(5^6)^3$
c. $(6^7)^7$	d. $(13^8)^9$
e. $(7^6)^{15}$	f. $(11^8)^7$
g. $(10^{10})^8$	h. $(7^{15})^5$
i. $(36^3)^2$	j. $(49^4)^6$
k. $(81^3)^5$	l. $(64^2)^7$

**Question 3 – Zero Index (Numerical Bases)**

Simplify the following:

a. $2^0$	b. $(54)^0$
c. $5^0 7^0$	d. $8 \times 16^0$
e. $(5 + 4)^0$	f. $6^0 \times 6^4$
g. $\left(\frac{3}{2}\right)^0$	h. $9^0 + 16^0$
i. $15a^0$	j. $(21xy)^0$
k. $(6a^0)^2$	l. $\frac{16x^0}{4y^0}$

**Question 4 – Negative Indices (Numerical Bases)**

Simplify the following, giving your answer in positive index:

a. $2^{-2}$	b. $13^0 \times 13^{-8}$
c. $3^5 \times 3^{-4}$	d. $7^5 \times 7^{-9}$
e. $(11^5)^{-7}$	f. $\frac{5^{-3}}{5^4}$
g. $2^8 \div 2^4 \div 2^{-8}$	h. $\frac{2}{3^{-4}}$
i. $12x^{-3} \times 4x^{-8}$	j. $\frac{15a^3}{3a^4}$
k. $9a^5b \div 3ab^4 \times ab^2$	m. $((2y^{-1})^{-2})^{-3}$

### Question 5 – Miscellaneous Index Laws (Numerical Bases)

Simplify the following:

a. $4^4 \times 4^4 \times 3^4$	b. $\frac{5^8 \times 5^{-6}}{5}$
c. $2^3 4^4 \times 4^{-5} \times 2^0$	d. $\frac{2^3 \times 6^{-2}}{2^{-2} \times 3^{-4}}$
e. $(2^0 5^7)^2$	f. $3^5 \div 9^5 \times 3^2$
g. $(2 + 1)^2 \times 3^{-3}$	h. $\left(\frac{2}{3}\right)^2 \times \left(\frac{4}{9}\right)^2$
i. $\frac{4^2 \times 5^6 \times 3^8}{15^7 \times 32}$	j. $2^2 + 2^{-2} + 8^0$
k. $(-1)^2 \times (-1)^7$	l. $\frac{(3^2)^4 \times 4^8}{2^8}$