



COACHING CENTRE

Worksheet 26 INDICES AND SURDS

- Index notation and index laws
for multiplying and dividing

1 Evaluate each of the following.

a 5^2 b 2^3 c 3^3 d $(-4)^2$

2 Write the number or variable that is the base in these expressions.

a 3^7 b 6^4 c $(1.2)^5$ d $(-7)^3$
e $\left(\frac{2}{3}\right)^4$ f y^{10} g w^6 h t^2

3 Write the number that is the index in these expressions.

a 4^3 b 10^8 c $(-3)^7$ d $\left(\frac{1}{2}\right)^4$
e x^{11} f $(xy)^{13}$ g $\left(\frac{x}{2}\right)^9$ h $(1.3x)^2$

4 Write the prime factors of these numbers.

a 6 b 15 c 30 d 77

5 Simplify each of the following using the law for multiplication.

a $x^4 \times x^3$ b $a^6 \times a^3$ c $t^5 \times t^3$ d $y \times y^4$
e $d^2 \times d$ f $y^2 \times y \times y^4$ g $b \times b^5 \times b^2$ h $q^6 \times q^3 \times q^2$
i $x^3y^3 \times x^4y^2$ j $x^7y^3 \times x^2y$ k $5x^3y^5 \times xy^4$ l $xy^4z \times 4xy$
m $3m^3 \times 5m^2$ n $4e^4f^2 \times 2e^2f^2$ o $5c^4d \times 4c^3d$ p $9yz^2 \times 2yz^5$

6 Simplify each of the following using the law for division.

a $a^6 \div a^4$ b $x^5 \div x^2$ c $\frac{q^{12}}{q^2}$ d $\frac{d^7}{d^6}$
e $\frac{8b^{10}}{4b^5}$ f $\frac{12d^{10}}{36d^5}$ g $\frac{4a^{14}}{2a^7}$ h $\frac{18y^{15}}{9y^7}$
i $9m^3 \div m^2$ j $14x^4 \div x$ k $5y^4 \div y^2$ l $6a^6 \div a^5$
m $\frac{3m^7}{12m^2}$ n $\frac{5w^2}{25w}$ o $\frac{4a^4}{20a^3}$ p $\frac{7x^5}{63x}$
q $\frac{16x^8y^6}{12x^2y^3}$ r $\frac{6s^6t^3}{14s^5t}$ s $\frac{8m^5n^4}{6m^4n^3}$ t $-\frac{5x^2y}{xy}$

7 Simplify each of the following using the index laws.

a $b^5 \times b^2 \div b$ b $y^5 \times y^4 \div y^3$ c $c^4 \div c \times c^4$ d $x^4 \times x^2 \div x^5$
e $\frac{t^4 \times t^3}{t^6}$ f $\frac{p^2 \times p^7}{p^3}$ g $\frac{d^5 \times d^3}{d^2}$ h $\frac{x^9 \times x^2}{x}$
i $\frac{3x^3y^4 \times 8xy}{6x^2y^2}$ j $\frac{9b^4}{2g^3} \times \frac{4g^4}{3b^2}$
k $\frac{24m^7n^5}{5m^3n} \times \frac{5m^2n^4}{8mn^2}$ l $\frac{p^4q^3}{p^2q} \times \frac{p^6q^4}{p^3q^2}$