Non Calculator	Indices	AT2 L7

Law 1: Addition $\mathbf{x^a \times x^b = x^{a+b}}$

Ex 1 Simplify the following indices leaving them in index form.

1	$a^5 \times a^3$	**2**	$p^7 \times p^{-4}$	**3**	$2a^3 \times a^2$
4	$3q^2 \times 2q^5$	**5**	$a^{-5} \times a^{-2}$	**6**	$5r^6 \times r$
7	$c^2 \times c^3 \times c^5$	**8**	$2a^4 \times 2a^4 \times 2a^{-5}$	**9**	$3p^2 \times 4p^{-5}$
10	$5a^3 \times 2b^2 \times 2a^2$				

Law 2: Subtraction $\mathbf{x^a \div x^b = x^{a-b}}$

Ex 2 Simplify the following indices leaving them in index form.

1	$d^8 \div d^3$	**2**	$d^3 \div d^7$	**3**	$a^{-2} \div a^6$
4	$10a^8 \div 5a^5$	**5**	$24h^4 \div 8h$	**6**	$q^9 \div q^4 \times q^2$
7	$a^7 \times a^4 \div a^8$	**8**	$18r^6 \div 9r^9$	**9**	$\frac{4a^3 \times a^8}{a^4}$
10	$\frac{6a^7 \times 2a^5}{4a^{-2}}$				

Law 3: Negative $\mathbf{x^{-a} = \frac{1}{x^a}}$

Ex 3 Where possible find the value of the following in fractional form.

1	2^{-3}	**2**	5^{-3}	**3**	3^{-4}
4	$2^5 \times 2^{-3} \div 2^6$	**5**	$a^7 \div a^{10}$	**6**	10^{-6}
7	$\frac{2^2 \times 2^3}{2^{10}}$	**8**	$5^3 \div 5^5$	**9**	$\frac{10a^2 \times 3a^2}{6a^7}$
10	$\frac{4p^{-2} \times 5p^{-3}}{10p^2}$				

Law 4: Zero $\mathbf{x^0 = 1}$

Ex 4 Simplify the following indices leaving them in index form.

1	8^0	**2**	a^0	**3**	10^0
4	$w^3 \times w^{-5} \times w^2$	**5**	$4a^0$	**6**	-2^0
7	$3a^5 \times 2a^{-5}$	**8**	$\frac{4d^2 \times 6d^5}{12d^7}$	**9**	$\frac{3a^5 \times 10a}{6a^6}$
10	$\frac{6d^3 \times 8d^4}{3d^2 \times 4d^5}$				

Law 5: Multiplication $\mathbf{(x^a)^b = x^{a \times b}}$

Ex 5 Simplify the following indices leaving them in index form.

1	$(a^2)^3$	**2**	$(p^5)^4$	**3**	$(2^6)^3$
4	$(t^2)^6 \times t^4$	**5**	$(w^4)^3 \div w^5$	**6**	$a^{13} \div (a^3)^2$
7	$(2r^3)^3$	**8**	$(2q^2)^5$	**9**	$\frac{(a^3)^2 \times a^{10}}{(a^4)^2}$
10	$\frac{(3d^4)^2 \times d^5}{(d^2)^5}$				