STANDARD FORM

38	**Converting a small number into standard form**	$0.00000037 = 3.7 \times 10^{-7}$
39	**Converting a very large number to standard form**	$147\,100\,000\,000 = 1.471 \times 10^{11}$
40	**Converting to a small ordinary number**	$2.4 \times 10^{-6} = 0.0000024$
41	**Converting to a large ordinary number**	$5.67 \times 10^{9} = 5\,670\,000\,000$
42	**Adding or subtracting numbers in standard form**	The numbers must be converted into the ordinary numbers $$(2.3 \times 10^{4}) + (6.4 \times 10^{3})$$ $$= 23000 + 6400$$ $$= 29400$$ $$= 2.94 \times 10^{4}$$
43	**Multiplying numbers in standard form**	The format stays the same. We can use **index laws** to help us. $$(1.5 \times 10^{3}) \times (3 \times 10^{5})$$ $$= 4.5 \times 10^{3+5}$$ $$= 4.5 \times 10^{8}$$
44	**Dividing numbers in standard form**	The format stays the same. We can use **index laws** to help us. $$(2.5 \times 10^{11}) \div (5 \times 10^{13})$$ $$= 0.5 \times 10^{-2}$$ $$= 5 \times 10^{-3}$$

SURDS

45	**Multiply surds**	$\sqrt{a} \times \sqrt{a} = a$	
46	**Dividing**	$\dfrac{\sqrt{a}}{\sqrt{b}} = \sqrt{\dfrac{a}{b}}$	
47	**Add and subtract surds**	$\sqrt{a} + \sqrt{b}$ Cannot simplify	But $\sqrt{a} + \sqrt{a} = 2\sqrt{a}$
		$\sqrt{a} + \sqrt{a} = 2\sqrt{a}$	$5\sqrt{a} - 2\sqrt{a} = 3\sqrt{a}$
48	**Simplify**	$\sqrt{50} = \sqrt{25 \times 2}$ $= \sqrt{25} \times \sqrt{2}$ $= 5 \times \sqrt{2}$ $= 5\sqrt{2}$	$\sqrt{50} + \sqrt{18} = 5\sqrt{2} + 3\sqrt{2}$ $= 8\sqrt{2}$
49	**Rationalise the denominator** – Ensure there are no irrational numbers in the denominator	$\dfrac{1}{\sqrt{7}} = \dfrac{1}{\sqrt{7}} \times \dfrac{\sqrt{7}}{\sqrt{7}} = \dfrac{\sqrt{7}}{7}$	$\dfrac{1}{5+\sqrt{2}} = \dfrac{1}{5+\sqrt{2}} \times \dfrac{5-\sqrt{2}}{5-\sqrt{2}}$ $= \dfrac{5-\sqrt{2}}{3}$

Topic: Standard Form

Fraction	Part of a whole	
Numerator	the number on the top of a fraction	$\dfrac{Numerator}{Denominator}$
Denominator	the number on the bottom of a fraction	
Equivalent Fractions	Fractions which have the same value but look different	$\dfrac{1}{2} = \dfrac{3}{6} = \dfrac{10}{20}$
Simplifying Fractions	Divide numerator and denominator by HCF	$\dfrac{24}{30} = \dfrac{4}{5}$
Fraction of an Amount	Amount divided by the denominator then multiplied by the numerator.	$\dfrac{5}{7}$ of 42 $42 \div 7 \times 5 = 30$
Mixed Number	A number made from integer and fraction parts	$1\dfrac{3}{8}$
	Before multiplying, dividing, adding or subtracting, always change mixed numbers into Improper fractions	
Improper Fraction	A number made from integer and fraction parts	$1\dfrac{3}{8}$
Compare Fractions	Write them with a common denominator	
Unit Fraction	Has a numerator of 1	$\dfrac{1}{6}$
Reciprocal	The reciprocal of a number is one divided by the number.	Reciprocal of 7 is $\dfrac{1}{7}$
	Dividing by a number is the same as multiplying by its reciprocal	$\div 2$ is the same as $\times \dfrac{1}{2}$
Terminating Decimal	Decimals that can be written exactly.	0.38
Recurring Decimal	Decimals where one digit or a group of digits are repeated.	$0.777...... = 0.\dot{7}$ $0.803803.... = 0.\dot{8}0\dot{3}$
Simple Interest	Interest is calculated as a percent of an original loan	
Compound Interest	When interest is calculated on both the amount borrowed AND any previous interest	
Tax	A financial charge placed on sales or savings by the government e.g. VAT	
Loss	Income minus all expenses, resulting in a negative value.	
Profit	Income minus all expenses, resulting in a positive value.	