

Subject Reference	Mathematics and Statistics 1.2		
Title	Apply algebraic procedures in solving problems		
Level	1	Credits	4
		Assessment	External

This achievement standard involves applying algebraic procedures in solving problems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Apply algebraic procedures in solving problems. 	<ul style="list-style-type: none"> Apply algebraic procedures, using relational thinking, in solving problems. 	<ul style="list-style-type: none"> Apply algebraic procedures, using extended abstract thinking, in solving problems.

Students need to be familiar with procedures related to:

- factorising
- expanding
- simplifying algebraic expressions involving exponents, such as $(2x^4)^3$ or $\frac{12a^5}{8a^7}$
- substituting values into formulae
- manipulating and simplifying expressions such as $\frac{3x}{4} - \frac{x+2}{3}$ or $\frac{3x^2 - 12}{x - 2}$
- rearranging formulae such as $E = \frac{1}{2}mv^2$ or $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$
- solving linear equations or inequations such as $5x + 12 = 3 - 2x$ or $3(x - 2) < 7$
- solving quadratic equations such as $(8x + 3)(x - 6) = 0$, $x^2 + 5x - 6 = 0$, $3x^2 = 10x - 8$ (completing the square and the quadratic formula are not required)
- solving simple equations involving exponents such as $x^3 = 8$, $5^x = 125$
- solving pairs of simultaneous linear equations with two unknowns.

AS1.2 Algebra

To be able to do well in this AS in 11mae good competence is required in skills that are applied in solving algebraic problems.

The skills required are listed below and are picked up in the series of revision profile sheets as outlined below.

The last column gives online references (mostly from Transum) and to an old textbook Catley Form 4 which can be taken home to use. As a general online reference go to <https://www.mathsisfun.com/algebra/index.html>.

Use the index to search for the required skill, look at the notes, or just test yourself on the questions (which are usually towards the bottom of the page).

The sheets are all posted on the TGC Maths web site, with answers. (This can also be accessed under the TGC web site / Curriculum / Mathematics)

Review sheets breakdown:

		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	References and Further Exercises
A	Basic skills + / - / x / ÷	√	√	√								Catley Ex 9.1 – 9.5 https://www.transum.org/Maths/Activity/Algebra/Collecting_Like_Terms.asp
B	Expanding – single bracket			√	√	√	√	√				Catley Ex 14.1 – 14.2 https://www.transum.org/software/SW/Starter_of_the_day/Students/Brackets.asp?
C	Expanding – quadratic (two brackets)			√	√	√	√	√	√			Catley Ex 14.5 https://www.transum.org/software/SW/Starter_of_the_day/Students/Brackets.asp?
D	Factorising - single			√	√	√	√	√	√			Catley Ex 14.3 – 14.4 https://www.transum.org/Software/SW/Starter_of_the_day/Students/Factorising.asp
E	Factorising - quadratic (two brackets)				√	√	√	√	√			Catley Ex 14.6, 14.8, https://www.transum.org/Software/SW/Starter_of_the_day/Students/Factorising.asp
F	Simplifying expressions involving exponents, such as $(2x^4)^3$ or $\frac{12a^5}{8a^7}$	√	√	√	√	√	√		√			Catley Ex 9.6 – 9.11, 9.13 – 9.15
G	Substituting values into formulae				√	√	√	√	√			Catley Ex 9.16 https://www.mathsisfun.com/algebra/substitution.html
H	Solving linear equations such as $5x + 12 = 3 - 2x$ or inequations $3(x - 2) < 7$			√	√		√	√	√			Catley Ex 10.1 – 10.10 https://www.transum.org/software/SW/Starter_of_the_day/Students/Equations.asp Catley Ex 10.2 – 10.13 https://www.transum.org/software/SW/Starter_of_the_day/Students/Inequalities.asp
I	Solving quadratic equations such as $(8x + 3)(x - 6) = 0$, $x^2 + 5x - 6 = 0$, $3x^2 = 10x - 8$							√	√			Catley Ex 14.11 – 14.12 https://www.transum.org/software/SW/Starter_of_the_day/Students/Quadratic.asp
J	Solving simple equations involving exponents such as $x^3 = 8$, $5^x = 125$					√	√	√	√			

The following sections are usually introduced in Year 11 and are included in supplementary review sheets for those students who are interested;

K	Manipulating and simplifying expressions such as $\frac{3x}{4} - \frac{x+2}{3}$ or $\frac{3x^2 - 12}{x - 2}$											Catley Ex 9.12
L	Rearranging formulae such as $E = \frac{1}{2}mv^2$ or $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$										https://www.transum.org/software/SW/Starter_of_the_day/Students/Changing_The_Subject.asp	
M	Solving pairs of simultaneous linear equations with two unknowns.										https://www.transum.org/software/SW/Starter_of_the_day/Students/Simultaneous_Equations.asp	