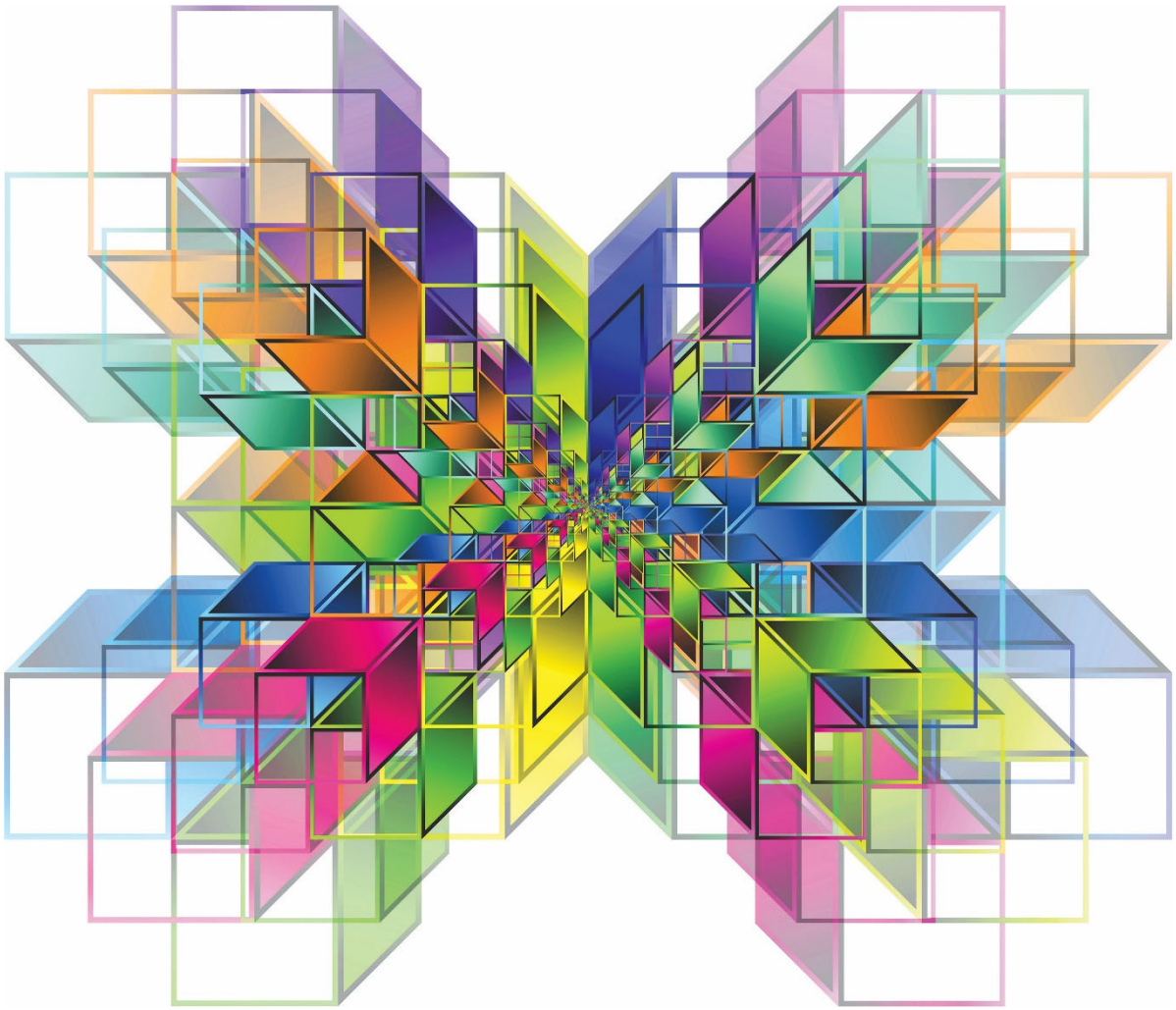
GCSE MATHEMATICS

Hub school network meetings

Supporting GCSE Mathematics revision booklet

Published: Spring 2020



Contents

AQA

A9 Plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form $y = mx + c$ to identify parallel lines; find the equation of the line through two given points, or through one point with a given gradient

Teaching Guidance

Students should be able to:

- recognise that equations of the form $y = mx + c$ correspond to straight-line graphs in the coordinate plane
- draw graphs of functions in which y is given explicitly or implicitly in terms of x
- complete tables of values for straight-line graphs
- calculate the gradient of a given straight-line given two points or from an equation
- manipulate the equations of straight lines so that it is possible to tell whether lines are parallel or not
- work out the equation of a line, given two points on the line or given one point and the gradient.

Notes

Tables of values may or may not be given.

See A10

Examples

1 Draw the graph of $y = 3x - 1$ (both with and without a table of values).

2 Draw the graph of $x + 2y = 10$

3 Show clearly that the lines $2x + y = 5$ and $4x = 3 - 2y$ are parallel.

4 *A* has coordinates (3, –5). *B* has coordinates (6, 7).

Work out the equation of the straight line *AB*.

A9h Plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form $y = mx + c$ to identify parallel lines **and perpendicular lines**; find the equation of the line through two given points, or through one point with a given gradient

Teaching Guidance

Students should be able to:

- work out the gradients of lines that are parallel and perpendicular to a given line
- show that two lines are parallel or perpendicular using gradients
- manipulate the equations of straight lines so that it is possible to tell whether or not lines are perpendicular
- know that the gradients of perpendicular lines are the negative reciprocal of each other.

Notes

Tables of values may or may not be given.

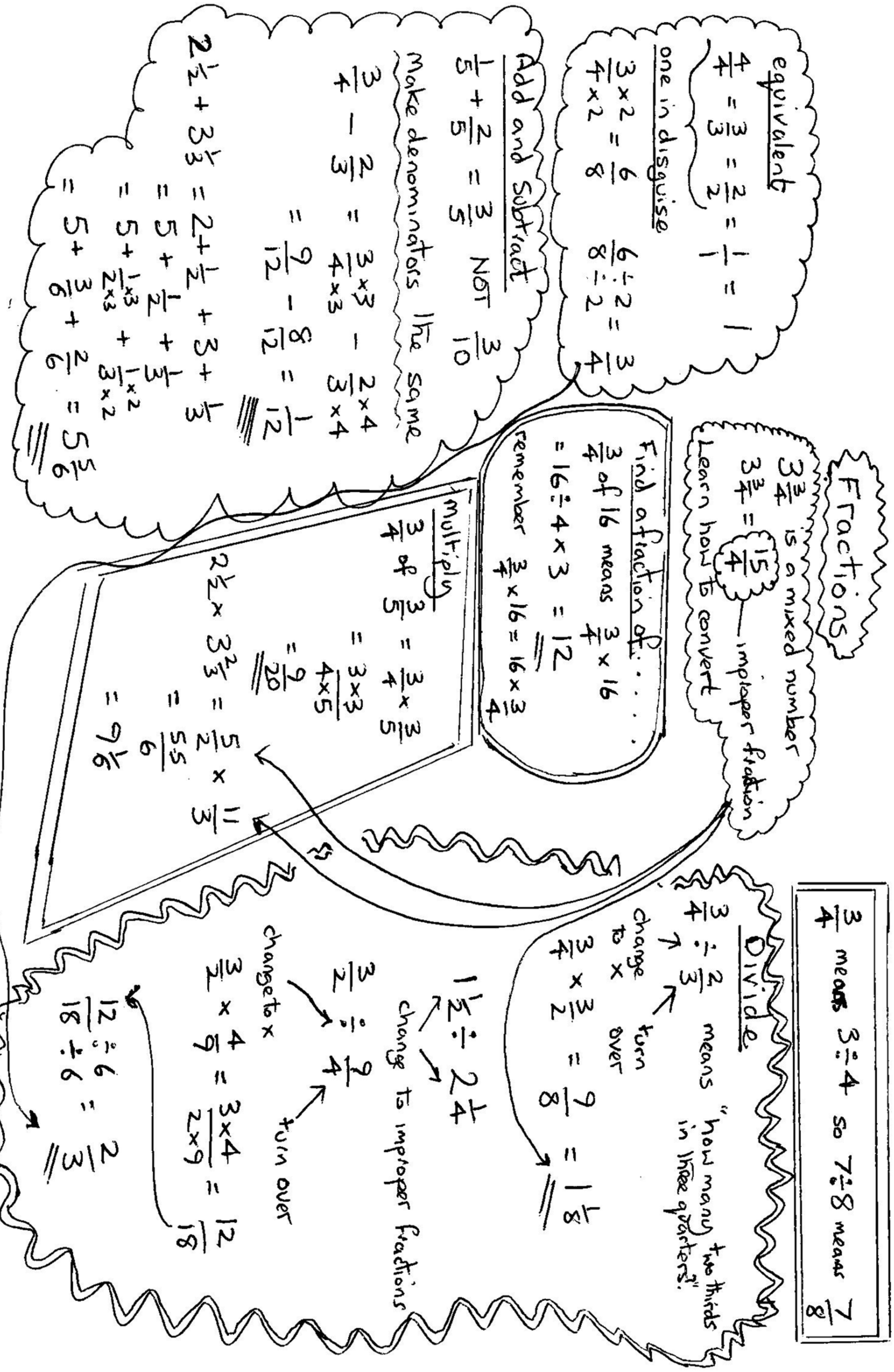
See A16h

Examples

1 Work out the gradient of a line that is perpendicular to the line $2x + 5y = 6$

2 A is (2, 3), B is (5, 8), C is (7, 6) and D is (1, –4).

Show that $ABCD$ is a trapezium.


Fractions
3¾ is a mixed number
3¾ = 15/4 improper fraction
Learn how to convert
equivalent
4/4 = 3/3 = 2/2 = 1/1 = 1
one in disguise
3×2 / 4×2 = 6/8
6÷2 / 8÷2 = 3/4
Add and Subtract
1/5 + 2/5 = 3/5 NOT 3/10
Make denominators the same
3/4 − 2/3 = 3×3 / 4×3 − 2×4 / 3×4
= 9/12 − 8/12 = 1/12
2½ + 3⅓ = 2 + ½ + 3 + ⅓
= 5 + ½ + ⅓
= 5 + 1×3 / 2×3 + 1×2 / 3×2
= 5 + 3/6 + 2/6 = 5 5/6
Find a fraction of....
3/4 of 16 means 3/4 × 16
= 16 ÷ 4 × 3 = 12
remember 3/4 × 16 = 16×3 / 4
Multiply
3/4 of 3/5 = 3/4 × 3/5 = 3×3 / 4×5 = 9/20
2½ × 3⅔ = 5/2 × 11/3 = 55/6 = 9 1/6
Divide
3/4 ÷ 2/3 means "how many two thirds in three quarters?"
change to ×
turn over
3/4 × 3/2 = 9/8 = 1 1/8
1½ ÷ 2¼
change to improper fractions
3/2 ÷ 9/4
turn over
change to ×
3/2 × 4/9 = 3×4 / 2×9 = 12/18
12/18 ÷ 6 ÷ 6 = 2/3
3/4 means 3 ÷ 4 so 7 ÷ 8 means 7/8

Fractions.

1. *Show how you would work out* $\frac{2}{3}$ *of an hour.*

2. *A plastic supermarket container holds* $2\frac{1}{4}$ *litres of milk.*
If one litre of milk is $1\frac{3}{4}$ *pints, how many pints of milk are in the container?*

3. *John says* $\frac{1}{3}$ *of an hour plus* $\frac{1}{2}$ *of an hour plus* $\frac{1}{6}$ *of an hour, is 56 minutes.*
Show why he is wrong.

4. *A kitten weighs* $\frac{5}{8}kg$. *It increases its weight by* $\frac{1}{5}$ *kg each week.*
How much will the kitten weigh in 3 weeks' time?

5. *I want to cut a piece of wood* $4\frac{1}{2}$ *metres long into lengths each* $\frac{3}{4}$ *of a metre long?*
How many lengths can be cut?

6. *Put these fractions in order, smallest first* $\frac{1}{2}, \frac{4}{5}, \frac{3}{4}, \frac{2}{3}$.

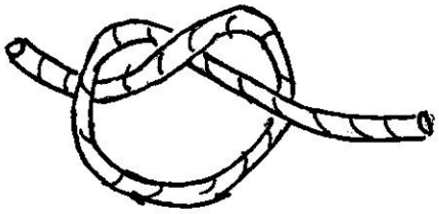
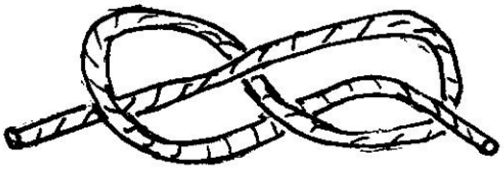
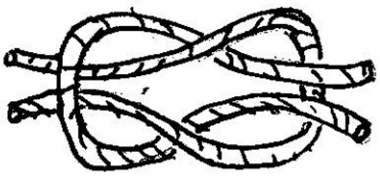
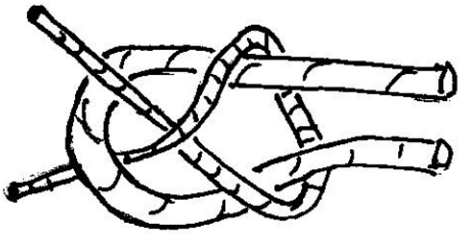
7. *An athlete weighed* $14\frac{1}{2}$ *stones before training for a marathon.*

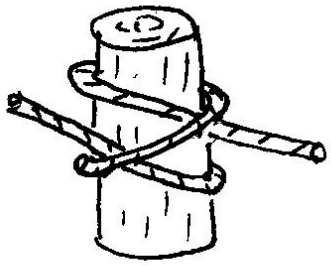
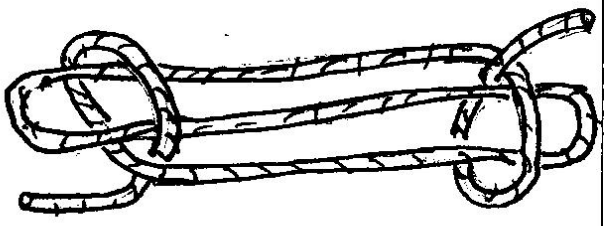
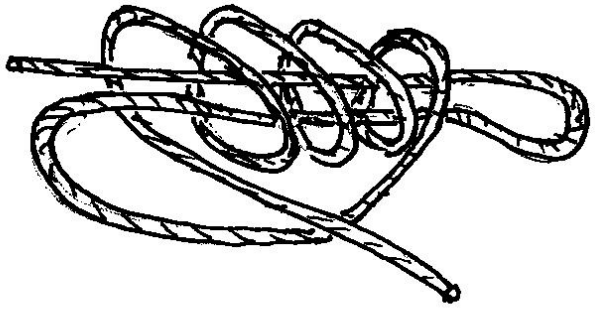
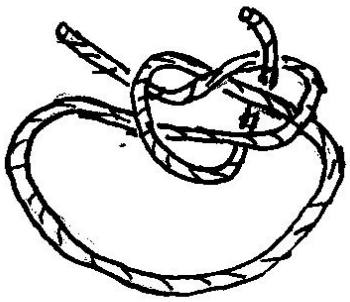
After training she lost $1\frac{1}{7}$ *stones. How much did she weigh after training?*

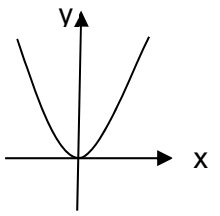
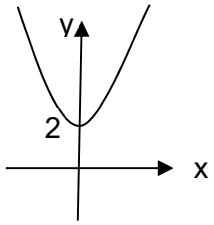
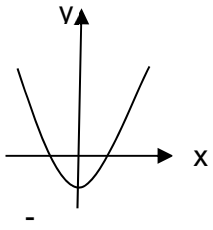
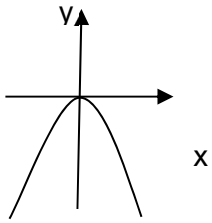
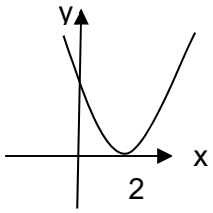
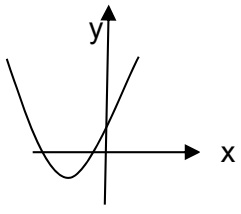
Transformations

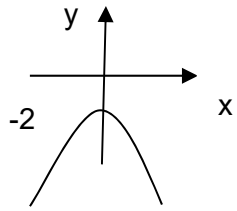
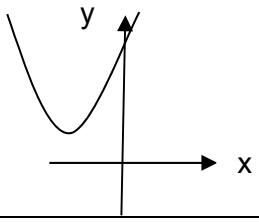
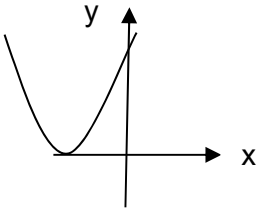
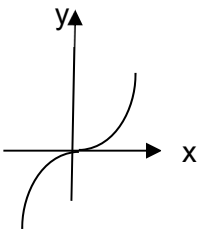
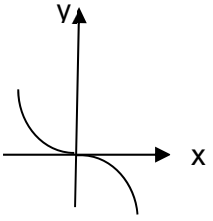
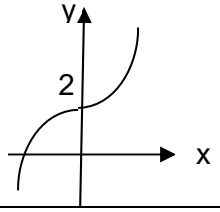
	T	R	R	E
How to fully describe				
Tricky				

Knots

 Name the knot and one use.	Overhand knot. Used to make other knots.
 Name the knot and one use.	Figure of eight knot. Used as a stop knot.
 Name the knot and one use.	Reef knot. Used to join two similar diameter ropes.
 Name the knot and one use.	Sheet bend knot. Used to join two different diameter ropes.

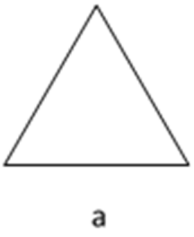
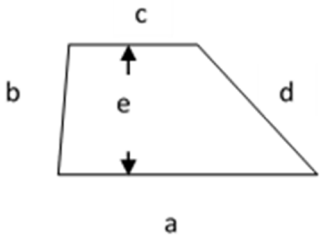
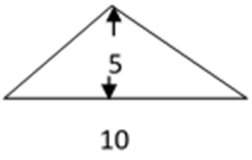
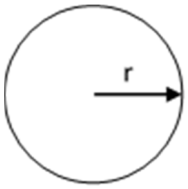
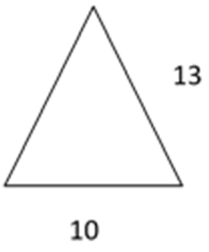
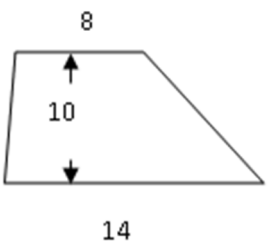
 Name the knot and one use.	Clove hitch knot. Used to fasten a rope to a pole.
 Name the knot and one use.	Sheepshank knot. Used to shorten a rope or overcome a frayed section.
 Name the knot and one use.	Grinner knot. Used for securing fish hooks.
 Name the knot and one use.	Bowline. Used to form a non-slip loop

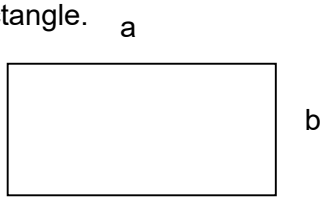
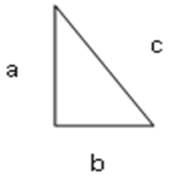
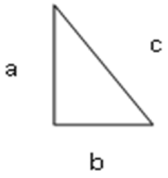
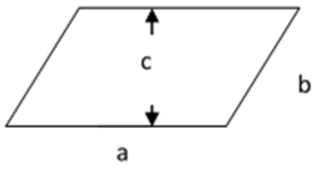
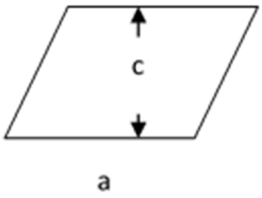
	What is the equation of this curve?	$y = x^2$
	What is the equation of this curve?	$y = x^2 + 2$
	What is the equation of this curve?	$y = x^2 - 2$
	What is the equation of this curve?	$y = - x^2$
	Is the equation of the curve likely to be $y = (x + 2)^2$ or $y = (x - 2)^2$?	$y = (x - 2)^2$
	How many roots in the graph?	2

 What is the equation of this curve?	$y = -x^2 - 2$
 How many roots in the graph?	0
 How many roots in the graph?	1
 What is the equation of this curve?	$y = x^3$
 What is the equation of this curve?	$y = -x^3$
 What is the equation of this curve?	$y = x^3 + 2$

Factorise $3x - 9$	$3(x - 3)$
Factorise completely $3x^2 - 9x$	$3x(x - 3)$
Factorise $x^2 - 2x$	$x(x - 2)$
Factorise $a^2 - ab$	$a(a - b)$
Factorise completely $9a^2b^3 - 12a^3\,b^5$	$3a^2\,b^3\,(3 - 4ab^2)$
Factorise completely $9x^2 - 3x$	$3x(3x - 1)$

Factorise $x^2 + 3x + 2$	$(x + 2)(x + 1)$
Factorise $x^2 + x - 2$	$(x - 1)(x + 2)$
Factorise $x^2 - 2x - 3$	$(x - 3)(x + 1)$
Factorise $x^2 - 4x + 3$	$(x - 3)(x - 1)$
Factorise $x^2 - 16$	$(x + 4)(x - 4)$
Factorise completely $2x^2 - 8$	$2(x + 2)(x - 2)$

Give an expression for the perimeter of this equilateral triangle.  	Perimeter = 3a
Give an expression for the area of this trapezium.  	$\left(\frac{a+c}{2}\right)e$
Calculate the area of this triangle  	25
Give an expression for the circumference and for the area of this circle.  	$circumference = 2\pi r$ $area = \pi r^2$
Calculate the perimeter and area of this isosceles triangle.  	Perimeter = 36 Area = half x base x height = half x 10 x 12 = 60
Calculate the area of this trapezium.  	$\left(\frac{8+14}{2}\right) \times 10 = 110$

Give an expression for the area and for the perimeter of this rectangle. 	Area = ab Perimeter = 2a + 2b
Give an expression for the area of this right angled triangle. 	$\frac{ab}{2}$
Give an expression for the perimeter of this right angled triangle. 	$a + b + c$
Give an expression for the area of this parallelogram. 	ac
Give an expression for the area and for the perimeter of this rhombus. 	Area = ac Perimeter = 4a
Give an expression for the area and for the perimeter of this square. 	Area = m^2 Perimeter = 4m

Contact us

Our friendly team will be happy to support you between 8am and 5pm, Monday to Friday.

Tel: 0161 957 3852
Email: maths@aqa.org.uk
Twitter: @AQAMaths

aqa.org.uk