

# Welcome to A Level Mathematics

Simplify the following expressions.

What are the common misconceptions?

$$x(x + 2) - 2(x - 4)$$

$$7 - \frac{8 + 10n}{2}$$

$$3n - 7 - (-n - 6)$$

**Paper 1: Pure Mathematics 1 (\*Paper code: 9MA0/01)**

**Paper 2: Pure Mathematics 2 (\*Paper code: 9MA0/02)**

***Each paper is:***

***2-hour written examination***

***33.33% of the qualification***

***100 marks***

### **Content overview**

- Chapter 1 – Algebraic Expressions
- Chapter 2 – Quadratics
- Chapter 3 – Equations and Inequalities
- Chapter 4 – Graphs and Transformations
- Chapter 5 – Straight Line Graphs
- Chapter 6 – Circles
- Chapter 7 – Algebraic Methods
- Chapter 8 – The Binomial Expansion
- Chapter 9 – Trigonometric Ratios
- Chapter 10 – Trigonometric Identities and Equations
- Chapter 11 – Vectors
- Chapter 12 – Differentiation
- Chapter 13 – Integration
- Chapter 14 – Exponentials and Logarithms

### **Assessment overview**

- Paper 1 and Paper 2 may contain questions on any topics from the Pure Mathematics content.
- Students must answer all questions.
- Calculators can be used in the assessment.

## **Paper 3: Statistics and Mechanics (\*Paper code: 9MA0/03)**

***2-hour written examination***

***33.33% of the qualification***

***100 marks***

### **Content overview**

#### **Section A: Statistics**

- Topic 1 – Statistical sampling
- Topic 2 – Data presentation and interpretation
- Topic 3 – Probability
- Topic 4 – Statistical distributions
- Topic 5 – Statistical hypothesis testing

#### **Section B: Mechanics**

- Topic 6 – Quantities and units in mechanics
- Topic 7 – Kinematics
- Topic 8 – Forces and Newton's laws
- Topic 9 – Moments

### **Assessment overview**

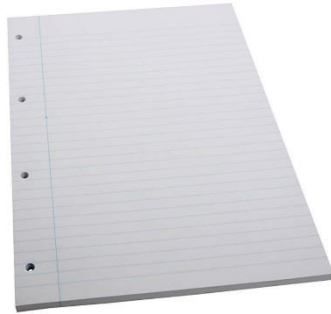
- Paper 3 will contain questions on topics from the Statistics content in Section A and Mechanics content in Section B.
- Students must answer all questions.
- Calculators can be used in the assessment.

# What should I bring to lessons?



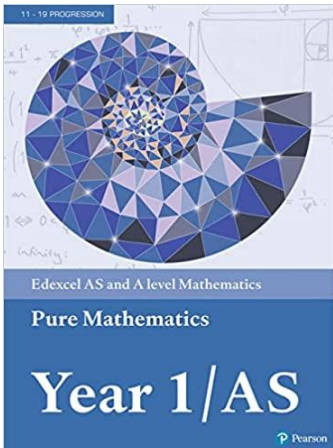
## Pens and pencils.

You will not need a protractor or compass.



## Exercise books

Keep your notes well organised.  
Use separate books for different teachers/courses.  
Squared paper may be useful for drawing graphs.



You will be issued with **textbooks** in September.  
You are expected to bring these to every lesson.



CASIO

Classwiz

fx-991EX

Approx £25



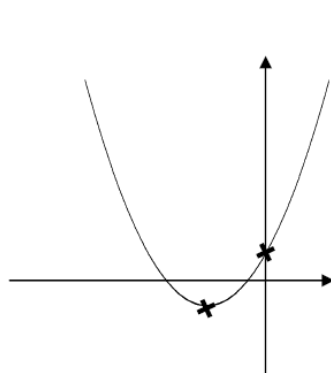
# Solutions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	E	K	J	M	B	S	N	A	H	Q	R	T	D	G	L	O	C	F	I

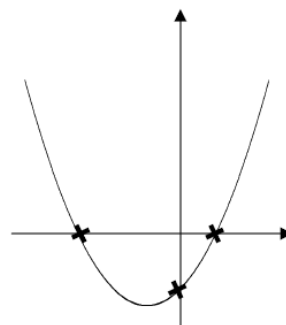
First column				Second column			
1	$\sqrt{x}$	11	$\frac{1}{x^2} \times \frac{1}{x^3}$	A	$x^{\frac{-3}{2}}$	K	$x^{\frac{-1}{2}}$
2	$\frac{1}{x}$	12	$(\sqrt[3]{x})^2$	B	$\frac{1}{2}x^{-3}$	L	$x^{\frac{9}{2}}$
3	$\frac{1}{\sqrt{x}}$	13	$\sqrt{x^7}$	C	$\frac{1}{2}x^{-1}$	M	$x^{-2}$
4	$\sqrt[3]{x}$	14	$\sqrt{\left(\frac{1}{x^8}\right)}$	D	$x^{-4}$	N	$x^{\frac{3}{2}}$
5	$\frac{1}{x^2}$	15	$\frac{1}{\sqrt{x^{-8}}}$	E	$x^{-1}$	O	$2x^{-1}$
6	$\frac{1}{2x^3}$	16	$x \times \sqrt{x \times x^6}$	F	$\frac{1}{2}x$	P	$x^{\frac{1}{2}}$
7	$\frac{2}{x^3}$	17	$\sqrt{\left(\frac{4}{x^2}\right)}$	G	$x^4$	Q	$x^{-5}$
8	$x\sqrt{x}$	18	$\sqrt{\left(\frac{1}{4x^2}\right)}$	H	$x^2$	R	$x^{\frac{2}{3}}$
9	$\frac{\sqrt{x}}{x^2}$	19	$\sqrt{\left(\frac{x^2}{4}\right)}$	I	$2x$	S	$2x^{-3}$
10	$\frac{1}{x^{-2}}$	20	$\sqrt{4x^2}$	J	$x^{\frac{1}{3}}$	T	$x^{\frac{7}{2}}$

# Quadratic Graphs

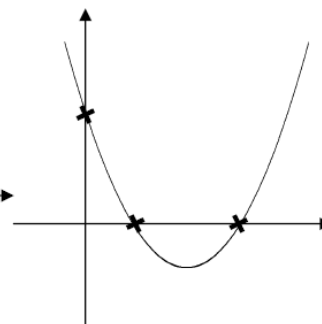
Label the coordinates of all the points marked x.



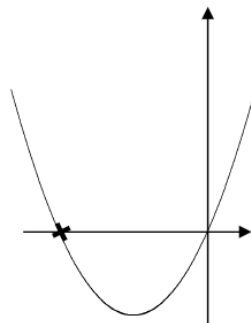
$$y = (x + 2)^2 - 3$$



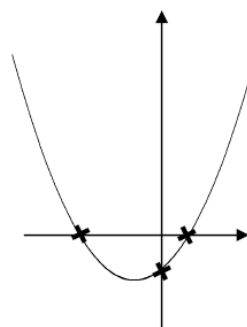
$$y = (x + 4)(x - 1)$$



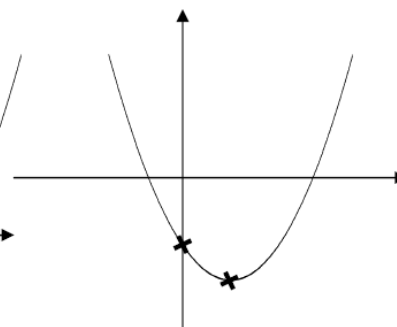
$$y = (2x - 1)(x - 3)$$



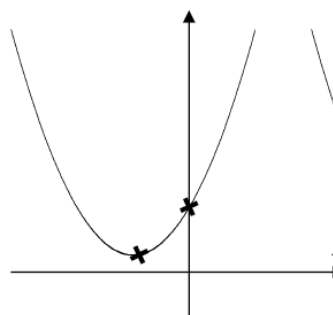
$$y = x(x + 4)$$



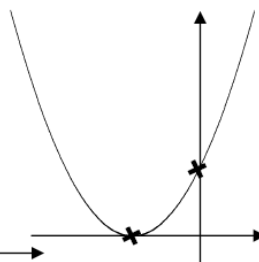
$$y = (x - 2)(x + 4)$$



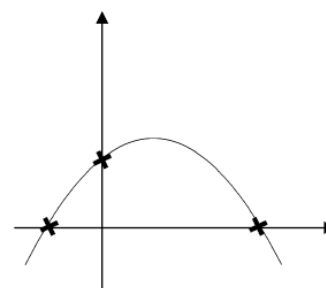
$$y = (x - 1)^2 - 3$$



$$y = (x + 2)^2 + 5$$



$$y = (x + 3)^2$$



$$y = (6 - x)(x + 1)$$

Card Set: Equations

$y = 4x + 4$	$4y = x + 3$
$y = 8x - 3$	$y + 4x + 6 = 0$
$3y = 2x - 8$	$y + 6x = 11$
$2y + 8 = 3x$	$2y + x = 4$
$2y = 8x + 3$	$y = 6x - 4$

Properties

These lines are parallel	These lines are perpendicular
These lines have the same $y$ -intercept	These lines have the same $x$ -intercept
These lines go through the point (1,5)	

## Functions Stack

Place the functions inside the correct places in the table.

Is there more than one solution?

There are three empty spaces, can you create functions that would fit in them?

	Symmetrical about the y axis	Rotational Symmetry about the origin	No Symmetry
Has 0 asymptotes			
Has 2 asymptotes			
Goes through the origin			

$$y = x^4 + 1$$

$$y = \frac{1}{x}$$

$$y = x^3$$

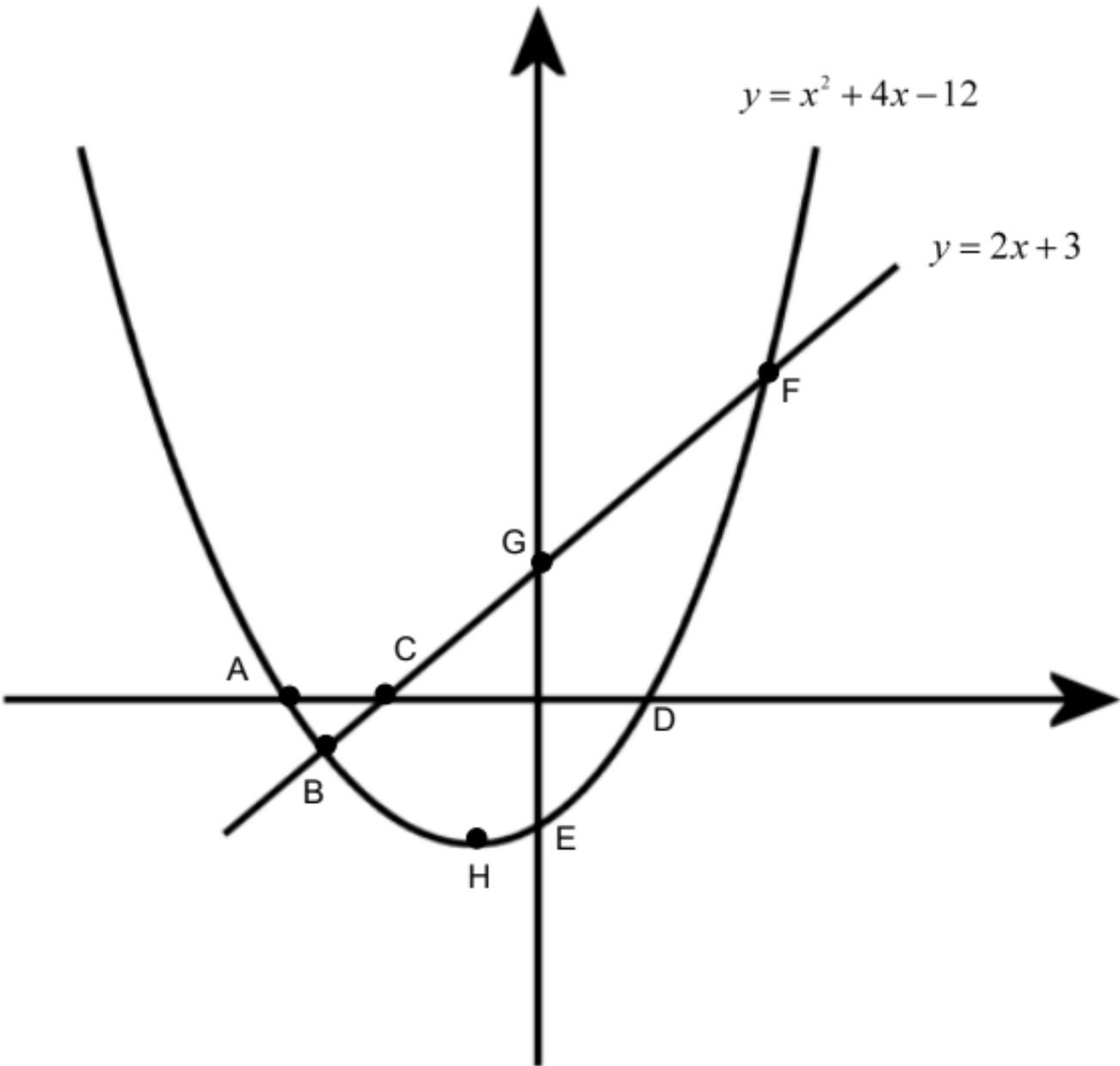
$$y = \frac{1}{x^2}$$

$$y = \frac{1}{x-2}$$

$$y = 2x^3 - 4x$$

Extension Task

*Find the co-ordinates of the points A, B, C, D, E, F, G and H*



Extension Task - **ANSWERS**

*Find the co-ordinates of the points A, B, C, D, E, F, G and H*

A(-6,0)

B(-5,-7)

C(- $\frac{3}{2}$ ,0)

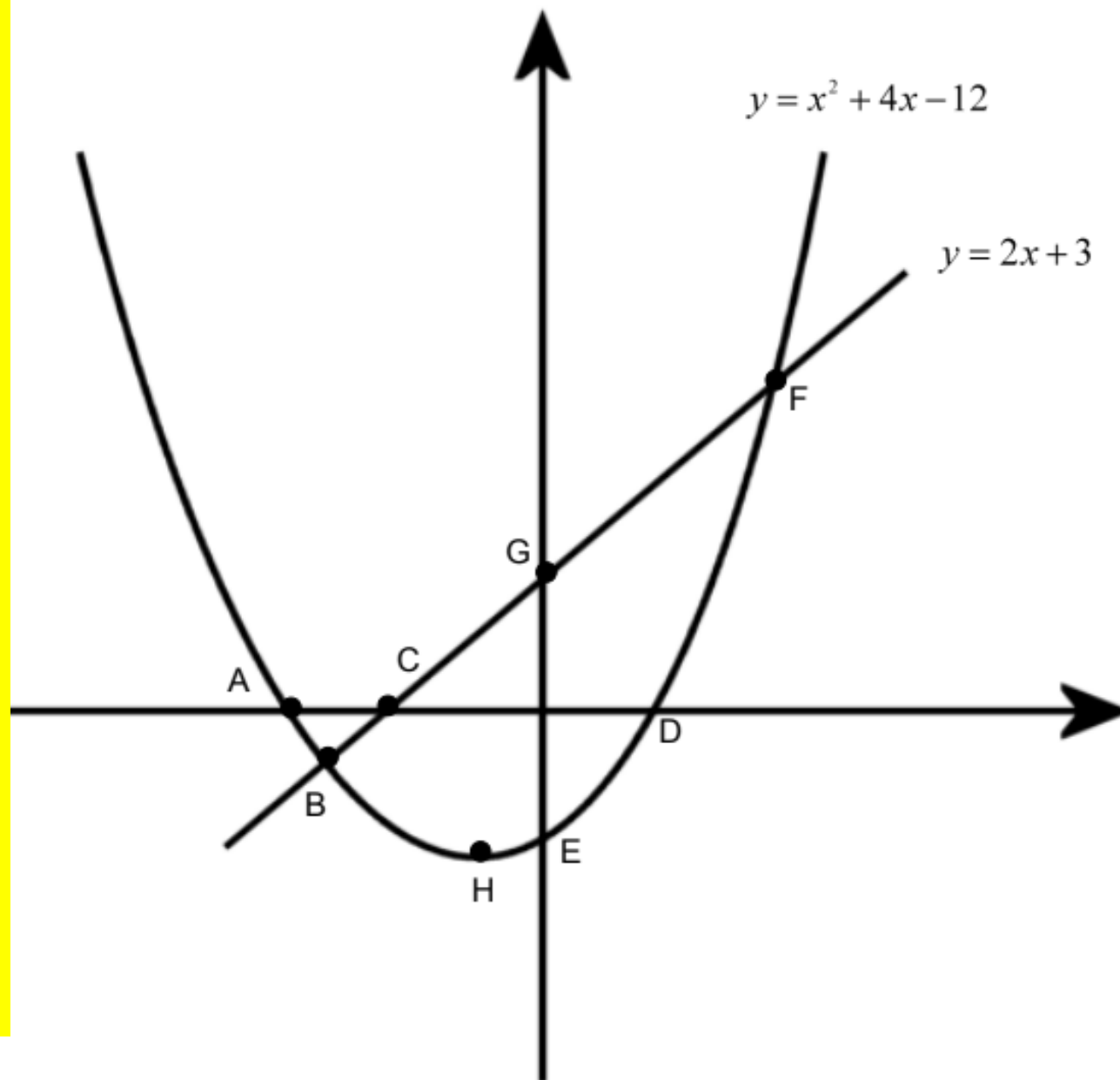
D(2,0)

E(0,-12)

F(3,9)

G(0,3)

H(-2,-16)



## A-Level Mathematics Summer Task

- All maths and further maths students are expected to complete the task.
- Work to be completed in the booklet, showing written calculations.
- You may wish to attempt all questions independently first, then use your notes or other resources to help with more difficult questions.
- 2-5 hours to complete
- You may use a calculator for all questions unless otherwise indicated.
- This will be checked by your teacher in September
- Due: First lesson back in September