




MATHEMATICS AT PARKSTONE



**“Adults who have a mathematics
A level earn almost 10 per cent more on
average than people who are like them in
every other way”**

author: Wolf, Alison
Publisher: Times Supplements Ltd.
Publication Name: Times Higher Education Supplement
Subject: Education
ISSN: 0049-3929
Year: 2004

Courses

- MATHS A LEVEL
- FURTHER MATHS A LEVEL
- CORE MATHS

- Students are taught using a variety of strategies and activities, throughout the course:
- Students explicitly know what and why they are learning from each topic.
- Regular reviews at the start of lessons help connect with previous work completed.
- Clear and detailed instructions and explanations are given throughout classes.
- Time is given for guided practice using a variety of resources.
- Scaffolding is often used to support students learning and help to build confidence with more challenging questions.
- Group work and using white boards allows students to share ideas and find solutions to multi stage problems.
- Modelling exam questions allows students to apply their knowledge in a variety of real life situations.
- MICAs allow students to practice their recall of facts on one topic only.
- Tuesday lunchtime Drop in Sessions help support students with their studies.

How Will I be taught in Maths?

- Chosen as one of your 3 A level options
 - Linear qualification, the examinations will be at the end of Year 13
 - The examination board is Edexcel
 - **Pure Mathematics 1** (2 hour exam)
 - **Pure Mathematics 2** (2 hour exam)
 - **Statistics and Mechanics** (2 hour exam)
-
- Each module is worth 33.3% of the final mark.
 - 9 lessons per 2 week cycle

MATHS A LEVEL

- PURE CONTENT

Content overview

- Topic 1 – Proof
- Topic 2 – Algebra and functions
- Topic 3 – Coordinate geometry in the (x, y) plane
- Topic 4 – Sequences and series
- Topic 5 – Trigonometry
- Topic 6 – Exponentials and logarithms
- Topic 7 – Differentiation
- Topic 8 – Integration
- Topic 9 – Numerical methods
- Topic 10 – Vectors

MATHS A
LEVEL

- APPLIED CONTENT

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 9 – Forces and Newton's laws
- Topic 9 – Moments

MATHS A
LEVEL

- You must study maths A level as well
- Further Maths can be picked as one of your 3 A level options

or

- As a fourth A level
- The examination board is Edexcel

- **100% exam based**
- **Linear qualification**, the examinations will be at the end of Year 13
- **Further Pure Mathematics 1** (1½ hour exam)
- **Further Pure Mathematics 2** (1½ hour exam)
- **Decision Maths 1** (1½ hour exam)
- **Further Mechanics 1** (1½ hour exam)

- Each module is worth 25% of the final mark.
- 18 lessons per 2 week cycle

FURTHER MATHS A LEVEL

- CORE PURE CONTENT:

- Proof
- Complex numbers
- Matrices
- Further algebra and functions
- Further calculus
- Further vectors
- Polar coordinates
- Hyperbolic functions
- Differential equations

FURTHER
MATHS

- Core maths, or maths studies, can be chosen as your curriculum enhancement option
- It is a taught course which is 100% exam based at the end of Year 12
- The examination board is AQA
- It is equivalent to an AS level in terms of difficulty and UCAS points
- It is suitable for anyone with a good pass at GCSE who has not opted for A level maths, You cannot do core Maths and A level Maths
- It supports courses such as psychology, chemistry, physics, biology and geography
- It will help you be better prepared for higher education and employment
- You will apply the maths you know in practical settings to solve everyday problems

CORE MATHS

Parkstone Grammar Sixth form

- Fulfil your potential
- Become an independent learner
- MICAs will help support and regular assess topics throughout Year 12 and 13
- Modular tests, 7 in total over the 2 years, will give students experience in solving A level questions and give evidence for predicted grades
- A graphics calculator will need to be bought, we use the Casio classwiz fx-991EX
- Ask thought provoking questions in class and get involved in classroom discussion
- Enjoy your Mathematics

Year 12 A Level Mathematics Work

5) $x = 54.1, 125.9^\circ$

USING THE CAST METHOD

ONLY SINE IS POSITIVE FOR THIS QUADRANT

ONLY COSINE GIVES POSITIVE RESULT IN THIS QUADRANT

ONLY TANGENT IS POSITIVE

ONLY COSINE GIVES POSITIVE RESULT IN THIS QUADRANT

WE FOCUS ONLY ON THE QUADRANTS THAT PRODUCE THE CORRECT SIGN (positive or negative), which is usually 2.

eg) $\sin x = \frac{1}{2}$ $0^\circ \leq x \leq 360^\circ$

positive result in our two relevant quadrants are $(0^\circ \text{ to } 90^\circ)$ & $(90^\circ \text{ to } 180^\circ)$

From calc $\Rightarrow x = \sin^{-1}(0.5)$
 $x = 30^\circ$

$180 - 30 = x = 150^\circ$

FROM CAST DIAGRAM

29/9 linear + quadratic modelling

1) The data forms a straight line so a linear model is appropriate

2) $C = 0.125t + 6.55$
 $\frac{1}{8}t + 6.55$

3) $E = 0.12 + 6.55 - 4t$
 $\frac{1}{8}t + 5.2$

Kilometre hours (h)	0	15	40	60	90	110
Cost (£)	6.55	8.44	11.55	15.2	19.4	24.2

25 6 days = 1700
 13 days = 1850

$C = ad + b$
 $1700 = 6a + b$
 $1850 = 13a + b$
 $150 = 7a$
 $a = 21.43$
 $b = 1000$

26 700 - (210 * 6) = 500 → constant fee
 350d is the cost per day
 500 is the constant base cost

27 $A = 750t - 17500$
 1) One assumption is that the increase in connected houses will be the same each year

28 1) As the data forms a straight line, the model is linear
 A = (24, 16)
 B = (27, 17)
 a) adj + b
 16.5 = 0.24 + b

SIN

• y axis ranges from -1 to 1
 • repeats itself every 360° (period)

• Some angles give the same result
 eg) $\sin 30^\circ = \sin 150^\circ$
 or $\sin \theta = \sin(180 - \theta)$

COS

• y axis ranges from -1 to 1
 • Period = 360°

• Some angles give the same result
 eg) $\cos 30^\circ = \cos(-30^\circ)$
 or $\cos \theta = \cos(-\theta)$
 eg) $\cos 30^\circ = \cos 330^\circ$
 or $\cos \theta = \cos(360 - \theta)$

($\tan 45^\circ = 1$)

TAN

$\tan \theta = \frac{\text{opp}}{\text{adj}} \rightarrow \infty$
 as θ just passes 90° the adj is tiny
 negative value → graph flips
 graph shoots up to infinity

as θ approaches 90° the adjacent approaches 0 = answer is huge + graph shoots up to infinity

• y axis ranges from $-\infty$ to $+\infty$ (infinity)
 • period = 180° (no angles give the same result within this)
 • adding π or subtracting multiples of 180° to an angle gives the same result
 eg) $\tan 30^\circ = \tan 210^\circ$
 $\tan 30^\circ = \tan(150^\circ)$
 or $\tan \theta = \tan(\theta \pm 180)$

TRIGONOMETRY

SIN COS TAN

opp hyp hyp hyp hyp hyp hyp hyp

area of a triangle = $\frac{1}{2} ab \sin C$

proof for $30^\circ, 45^\circ, 60^\circ$

equilateral triangle with sides of 2 units

from pythagoras

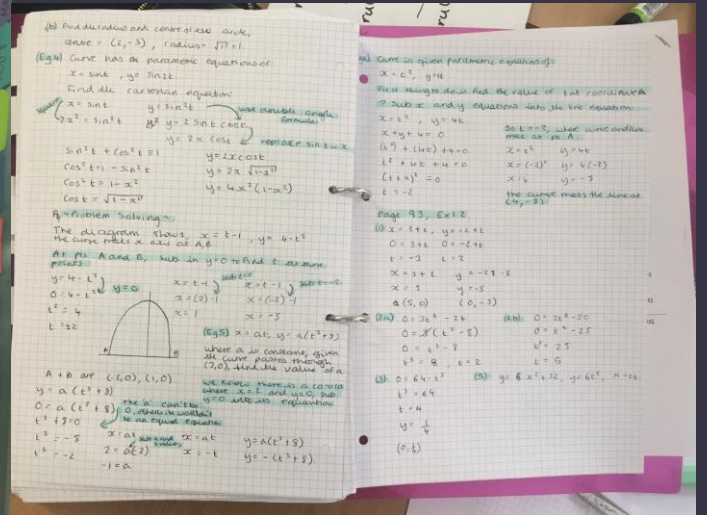
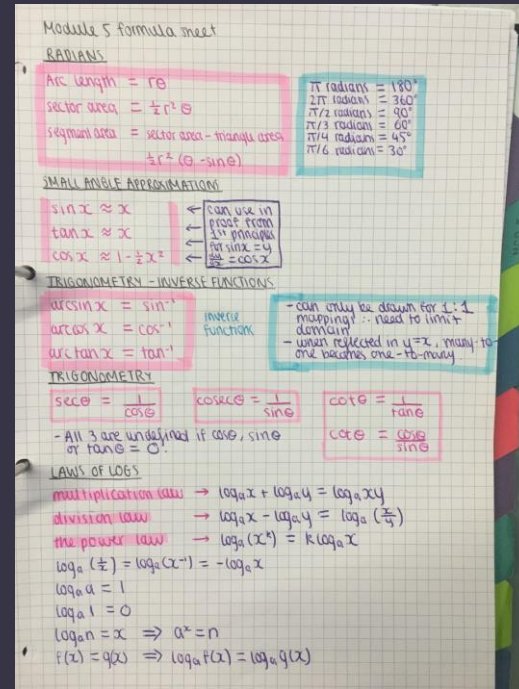
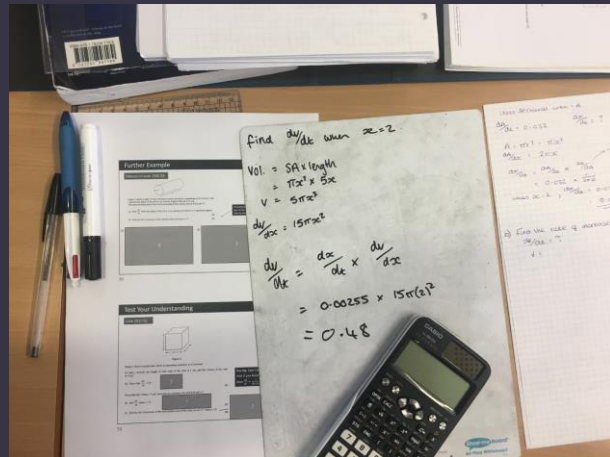
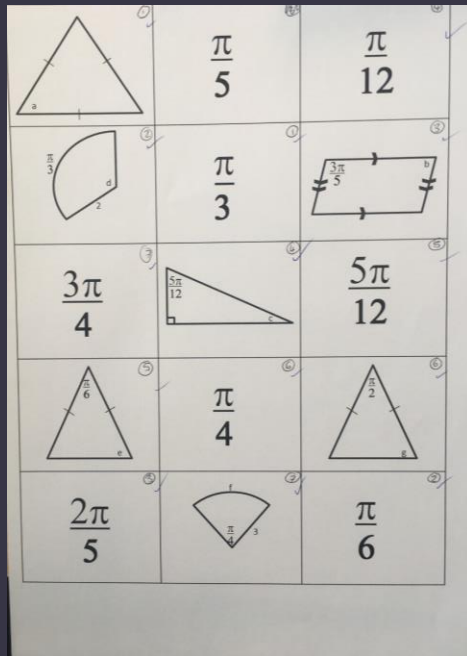
using a 60° angle $\sin 60 = \frac{\text{opp}}{\text{hyp}} = \frac{\sqrt{3}}{2}$
 $\cos 60 = \frac{\text{adj}}{\text{hyp}} = \frac{1}{2}$
 $\tan 60 = \frac{\text{opp}}{\text{adj}} = \sqrt{3}$

using a 30° angle $\sin 30 = \frac{1}{2}$
 $\cos 30 = \frac{\sqrt{3}}{2}$
 $\tan 30 = \frac{1}{\sqrt{3}}$

for 45°
 is a scalene triangle equal sides of 1 unit equal angle of 45 degrees

from pythagoras $\sin 45 = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$
 $\cos 45 = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$
 $\tan 45 = 1$

Year 13 A Level Mathematics Work



Don't worry about the mathematical content yet, this will all eventually make sense!

