Welcome to A level Further Maths

Your course

You will be studying A level Mathematics 9MA0 and A level Further Mathematics 9FM0 with options 3B Further Statistics 1 and 3C Further Mechanics 1 with the Edexcel exam board. Details of the specification and course assessment can be found here:

A level Mathematics:

https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assesment/a-level-l3-mathematics-specification-issue4.pdf

A level Further Mathematics:

https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assesment/a-level-l3-further-mathematics-specification.pdf

We encourage you to become familiar with the course specifications as soon as you start your course in September.

Summer bridging work

Read through carefully to make sure you understand what you are required to hand in. **You will need to hand in this work during your first lesson in September.**

TASK 1:

Complete the ten bridging work tasks on separate paper.

Task 2:

Write a review of either a book, article, podcast, documentary or video on a **mathematical topic** of your choosing. The review should be at least 1 paragraph long and should include the following:

a) A summary of the topic
b) Any real-life applications of the topic
c) Why you chose the topic

This will need to be turned in on the first lesson in September.

Materials:

As outlined in the sixth form course booklet, the Mathematics Department requests that students purchase new textbooks and a calculator to meet the demands of the specification, the details of which can be found below. New textbooks may be found from major retailers and used textbooks may be found on sites like eBay.

If you are eligible for the bursary due to financial difficulties, then the school will be purchasing these on your behalf at the beginning of the academic year.

1) Title: Pearson Edexcel AS and A level Mathematics Pure Mathematics Year 1/AS Textbook

   ISBN-13: 978-1292183398

2) Title: Edexcel AS and A level Mathematics Statistics & Mechanics Year 1/AS Textbook

   ISBN-13: 978-1292232539

3) Title: Pearson Edexcel AS and A level Further Mathematics Core Pure Mathematics Book 1/AS Textbook + e-book

   ISBN-13: 978-1292183336

4) Title: Pearson Edexcel A level Further Mathematics Core Pure Mathematics Book 2 Textbook + e-book

   ISBN-13: 978-1292183343

5) Title: Pearson Edexcel AS and A level Further Mathematics Further Statistics 1 Textbook + e-book

   ISBN-13: 978-1292183374

6) Title: Pearson Edexcel AS and A level Further Mathematics Further Mechanics 1 Textbook + e-book

   ISBN-13: 978-1292183312

7) Title: Pearson Edexcel A level Mathematics Pure Mathematics Year 2 Textbook + e-book

   ISBN-13: 978-1292183404

8) Title: Pearson Edexcel A level Mathematics Statistics & Mechanics Year 2 Textbook + e-book

   ISBN-13: 978-1446944073

Students may **choose** which calculator to purchase from the following:

Make: Casio

Model: fx-cg50 graphic calculator

Make: Casio

Model: fx-991EX advanced scientific calculator

Please purchase **books 1-3** listed above by **8 September 2023** and **books 4-8** by **4 January 2024**. Do not purchase the calculator yet. We will order the calculators as a school as we get a substantial discount. More information about the calculators will be given in September.

Prospective Year 12 Mathematicians 2023/2024

Summer Bridging Work

Thank you for choosing to study Mathematics in the sixth form at Roundwood Park School. As this is a linear course, all external exams will be sat at the end of Year 13 and will comprise of topics from pure maths, mechanics and statistics. In order to ensure that your skills are up to the appropriate standard and you are ready to start the A-Level, you are required to complete questions on 10 key topics, all of which you should have covered in your GCSE course.

Please complete all questions on separate paper and if you are unsure, the following pages provide links to extensive revision resources. The questions with solutions need to be handed in during your first lessons of A-Level Maths and should be used as preparation for a **test** that will take place in September. If you do not pass this test, you may be provided with a programme of additional work in order to bring your basic skills to the required standard.

We look forward to welcoming you in September, but if there are queries, please do not hesitate to email me at j.roberts@roundwoodpark.co.uk

Mrs J Roberts

Key Stage 5 Mathematics Coordinator

The Bridge to A level

Prospective Year 12 Mathematicians 2023/2024

This document contains a programme of activities and resources to prepare you to start A level in Maths in September.

It is aimed to be used throughout the remainder of the summer term and over the summer holidays to ensure you are ready to start your course in September.

The resources include:

1. **A list of 10 key pre-knowledge topics that will help you to be successful in your course. The topics covered are a mixture of GCSE topics, and topics which extend GCSE but which will be very useful on your A level course.**

2. **Suggested resources to help you with those topics with which you are having difficulty or need to revise.**

3. **A set of 10 worksheets that need to be completed and handed on your first week of lessons in September.**

TASK:

Complete all the questions on these 10 key topics, these are found in the next few pages. **You must have these ready to hand in by your first maths lesson in September. Make sure you show all your workings.**

If you struggle completing the questions on any of these topics or you need to revise them, you can either refer to the Hegarty Maths videos (see above for clip numbers) or use those available on either of these websites. You don't need passwords for any of these.

Hegarty Maths pre-A-level videos

Dr Frost videos **KS4 Algebra (the whole section is very useful) and some Shape (Trigonometry only)**

Corbett Maths **this is organised alphabetically (not very helpful), but has lots of practice questions with answers**

1   Solving quadratic equations

Question 1

Solve $x^2 + 6x + 8 = 0$ (2)

Question 2

Solve the equation $y^2 - 7y + 12 = 0$

Hence solve the equation $x^4 - 7x^2 + 12 = 0$

                                                                   (4)

Question 3

(i)   Express $x^2 - 6x + 2$ in the form $(x-a)^2 - b$

                                                            (3)

(ii)   State the coordinates of the minimum value on the graph of $y = x^2 - 6x + 2$

                                                            (1)

Total / 10

2   <u>**Changing the subject**</u>

Question 1

Make v the subject of the formula $E = \frac{1}{2} mv^2$

(3)

Question 2

Make r the subject of the formula $V = \frac{4}{3} \Pi r^2$

(3)

Question 3

Make c the subject of the formula $P = \frac{C}{C+4}$

(4)

Total / 10

3 <u>Simultaneous equations</u>

Question 1

Find the coordinates of the point of intersection of the lines $y = 3x + 1$ and $x + 3y = 6$

(3)

Question 2

Find the coordinates of the point of intersection of the lines $5x + 2y = 20$ and $y = 5 - x$

(3)

Question 3

Solve the simultaneous equations

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

$$y = 3x + 1$$

(4)

Total / 10

4   Surds

Question 1

(i)   Simplify $(3 + \sqrt{2})(3 - \sqrt{2})$

(2)

(ii)   Express $\dfrac{1+\sqrt{2}}{3-\sqrt{2}}$ in the form $a + b\sqrt{2}$ where a and b are rational

(3)

Question 2

(i)   Simplify $5\sqrt{8} + 4\sqrt{50}$. Express your answer in the form $a\sqrt{b}$ where a and b are   integers and b is as small as possible.

(2)

(ii)   Express $\dfrac{\sqrt{3}}{6-\sqrt{3}}$ in the form $p + q\sqrt{3}$ where p and q are rational

(3)

Total / 10

5 <u>**Indices**</u>

Question 1

Simplify the following

(i) a^0

(1)

(ii) $a^6 \div a^{-2}$

(1)

(iii) $(9a^6b^2)^{-0.5}$

(3)

Question 2

(i)   Find the value of $\left(\frac{1}{25}\right)^{-0.5}$

(2)

(ii)   Simplify $\dfrac{(2x^2y^3z)^5}{4y^2z}$

(3)

Total / 10

6   **Properties of Lines**

Question 1

A (0,2), B (7,9) and C (6,10) are three points.

(i)   Show that AB and BC are perpendicular

(3)

(ii)   Find the length of AC

(2)

Question 2

Find, in the form y = mx + c, the equation of the line passing through A (3,7) and B (5,-1).

Show that the midpoint of AB lies on the line x + 2y = 10

(5)

Total / 10

7 <u>Sketching curves</u>

Question 1

In the cubic polynomial f(x), the coefficient of x^3 is 1. The roots of f(x) = 0 are -1, 2 and 5.

Sketch the graph of y = f(x)

(3)

Question 2

Sketch the graph of $y = 9 - x^2$

(3)

Question 3

The graph below shows the graph of $y = \dfrac{1}{x}$

On the same axes plot the graph of $y = x^2 - 5x + 5$ for $0 \le x \le 5$
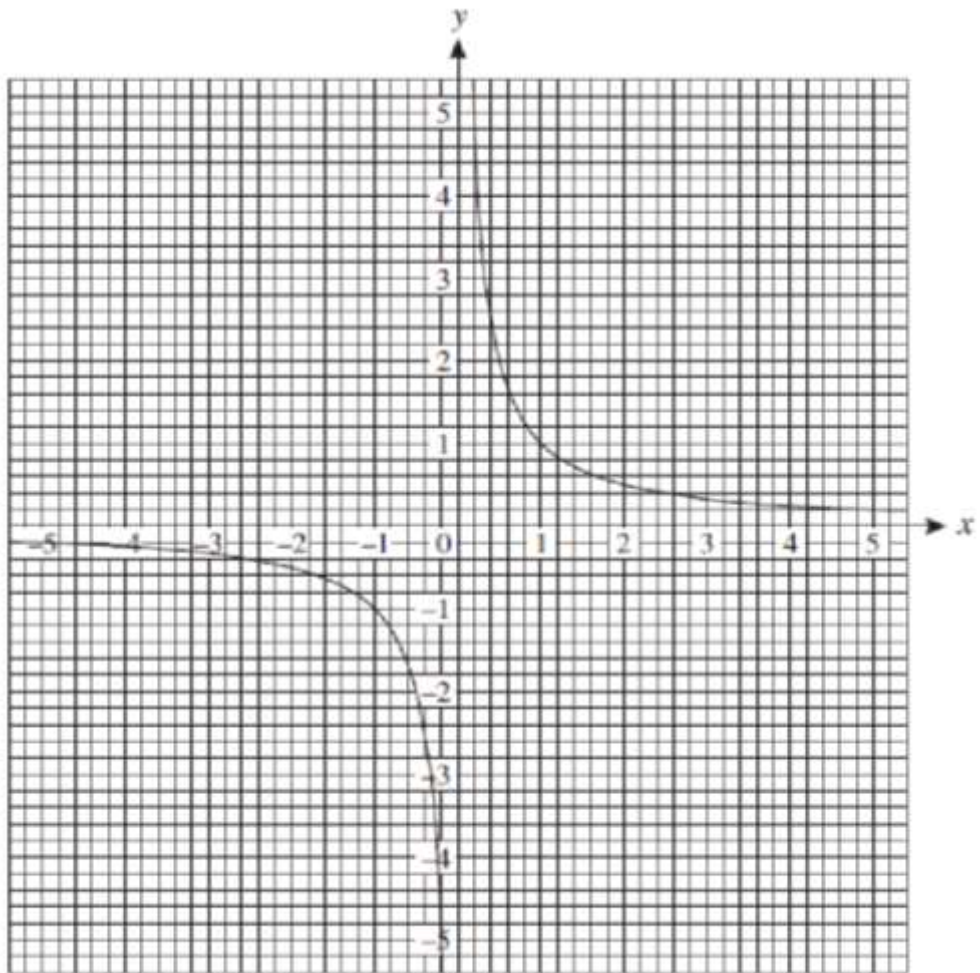
(4)

Total / 10
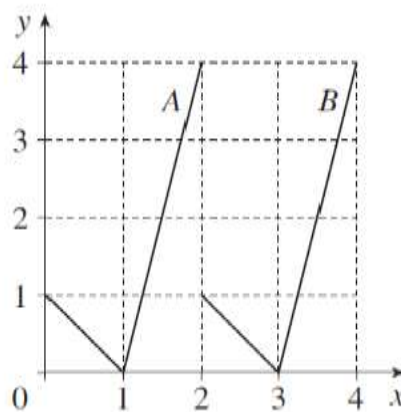
8   **Transformation of functions**

Question 1

The curve $y = x^2 - 4$ is translated by $\begin{pmatrix} 2 & 0 \end{pmatrix}$

Write down an equation for the translated curve. You need not simplify your answer.

(2)

Question 2

This diagram shows graphs A and B.

(i)   State the transformation which maps graph A onto graph B

(2)

(ii)   The equation of graph A is y = f(x).

        Which one of the following is the equation of graph B ?

y = f(x) + 2   y = f(x) – 2   y = f(x+2)   y = f(x-2)

y = 2f(x)   y = f(x+3)   y = f(x-3)   y = 3f(x)

(2)

Question 3

(i)   Describe the transformation which maps the curve $y = x^2$ onto the curve $y = (x+4)^2$

(2)

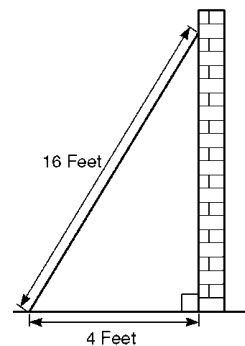(ii)   Sketch the graph of $y = x^2 - 4$

(2)

Total / 10

9   **Trigonometric ratios**

Question 1

Sidney places the foot of his ladder on horizontal ground and the top against a vertical wall.

The ladder is 16 feet long.

16 Feet

4 Feet

The foot of the ladder is 4 feet from the base of the wall.

(i)   Work out how high up the wall the ladder reaches. Give your answer to 3 significant figures.

(2)

(ii)   Work out the angle the base of the ladder makes with the ground. Give your answer to 3 significant figures
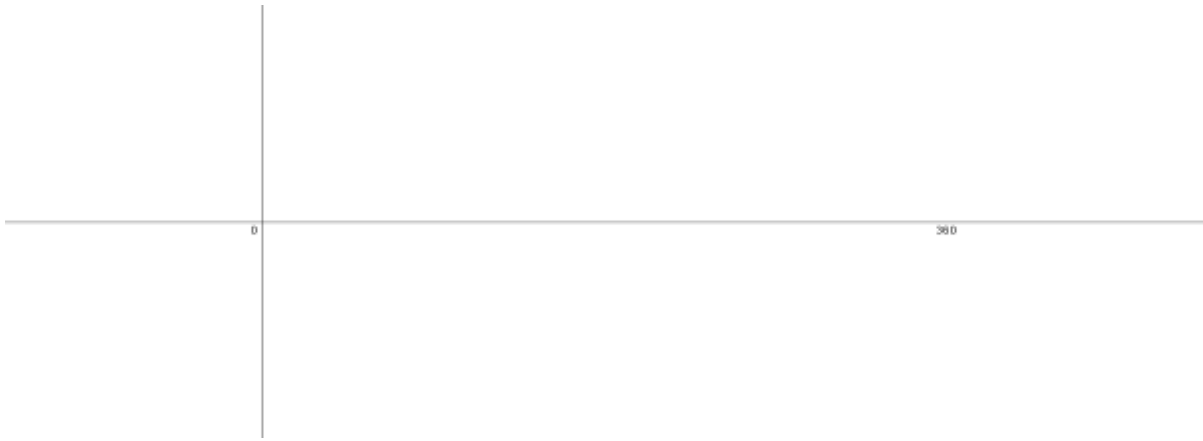
(2)

Question 2

Given that cos ϴ = $\frac{1}{3}$ and ϴ is acute, find the exact value of tan ϴ

(3)

Question 3

Sketch the graph of $y = \cos x$ for $0 \le x \le 360°$

0   380

(3)

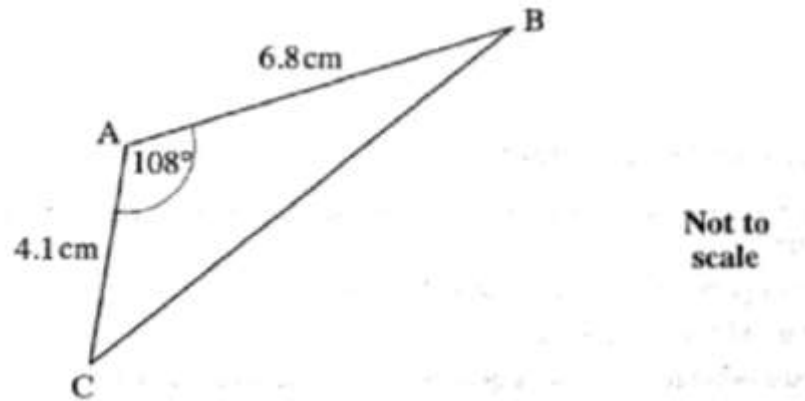**Total / 10**

10   <u>Sine / Cosine Rule</u>

Question 1

For triangle ABC, calculate
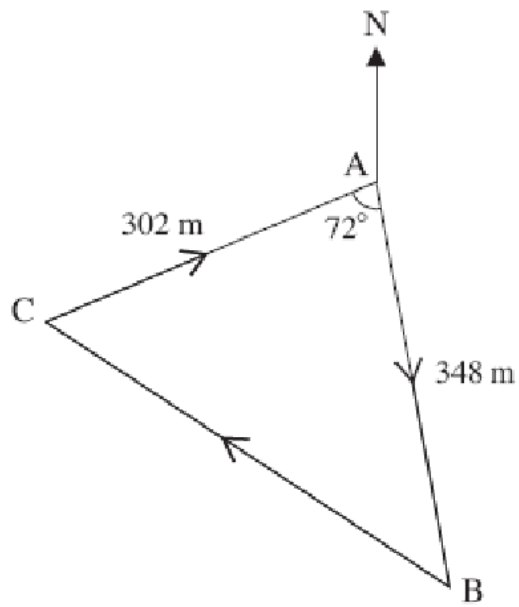
(i)   the length of BC

(3)

(ii)   the area of triangle ABC

(3)

Question 2

The course for a yacht race is a triangle as shown in the diagram below. The yachts start at A, then travel to B, then to C and finally back to A.

N

A

302 m

72°

C

348 m

B

Not to scale

Calculate the total length of the course for this race.

(4)

Total / 10