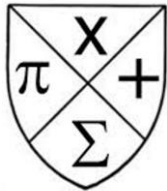


Subject: *A-Level Mathematics*

Exam Board: *Edexcel*



Everything is mathematical

Welcome to A-level Maths. We are delighted that you wish to continue studying maths in Year 12.

To demonstrate your commitment to the course and to prepare you for September, you must complete the following tasks to the best of your ability. These tasks are compulsory. We expect you spend at least 4 hours completing the tasks outlined in this pack.

The first task is designed to ensure that you are capable of all the GCSE skills that are required knowledge before starting the A-Level maths course. The first task must be completed and handed in by **Wednesday 12th July**.

The second task is designed to help you begin to understand some of the notation and topics that you will come across whilst studying A-level maths. The second task must be completed prior to your first maths lesson in Year 12 and brought with you to that lesson.

Learning Objectives:

- To ensure that you fully understand all of the GCSE topics which are pre-requirements of the A-Level maths course
- To understand different mathematical notation and symbols
- To develop the ability to work independently to research topics that are new or that you are unsure about.
- To develop a basic understanding of some of the topics that you will learn during the A-level maths course.

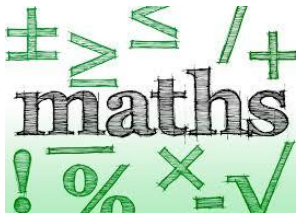
Contacts for Support:

- Mrs Ibbs – Room C7
- Mr Lloyd – Room J6
- Mr Phillips – Room C5
- Mr Bury – Room J7

Careers you can consider with this (subject):

| | | |
|--------------|-------------------|-------------------|
| Engineer | Teacher | Astronomer |
| Actuary | Data Analyst | Financial Advisor |
| Statistician | Software Engineer | Game Designer |
| Economist | Accountant | Meteorologist |

Task 1: A-Level Maths Induction Assignment



All of the questions in this assignment are from topics that you have studied at GCSE maths but that you will study further at A-Level maths. It must be completed on **A4 lined paper** and you must show all your workings. You may use your notes, revision guides, MathsWatch or the internet to help you – no question should be left blank. Remember the deadline for handing it in is **Wednesday 12th July**.

Section A: Indices (non calculator)

1. Simplify

(a) $y^7 \times y^8$ (b) $t^9 \div t^3$ (c) $3g^2 \times 4g^{10}$ (d) $(x^5)^3$ (e) $(3p^4)^2$

2. Write down the value of

(a) 7^{-2} (b) $25^{\frac{1}{2}}$ (c) $64^{\frac{2}{3}}$ (d) $\left(\frac{36}{81}\right)^{-\frac{1}{2}}$ (e) $(16)^{-\frac{3}{2}}$

Section B: Surds (non-calculator)

1. Simplify the following

(a) $\sqrt{32}$ (b) $\sqrt{27}$ (c) $\sqrt{175}$

2. Simplify

(a) $2\sqrt{5} + 4\sqrt{5}$ (b) $\sqrt{50} - \sqrt{32}$ (c) $2\sqrt{48} + 3\sqrt{12}$

3. Multiply out and simplify

(a) $\sqrt{2}(\sqrt{7} + \sqrt{2})$ (b) $(4 + \sqrt{3})(5 - \sqrt{3})$ (c) $(\sqrt{6} - \sqrt{2})(\sqrt{6} + \sqrt{2})$

Section C: Quadratics

1. Multiply out the following

(a) $(x + 7)(x + 3)$

(b) $(x - 3)^2$

(c) $(x + 3)(2x - 1)$

(d) $(3x + 4)(2x - 5)(x + 1)$

2. Factorise the following

(a) $x^2 + 7x + 10$

(b) $x^2 - 4x - 21$

(c) $x^2 - 25$

(d) $x^2 + 7x$

3. Solve these quadratics equations

(a) $x^2 - 5x + 6 = 0$

(b) $x^2 + 9x = 0$

(c) $2x^2 - 7x + 4 = 0$

Section D: Algebra

1. Rearrange the following to make x the subject

(a) $y = 5x - 2$

(b) $y = x^2 + 1$

(c) $3y = \frac{2x + 4}{7}$

(d) $xy = 3x + 7$

2. Simplify

(a) $\frac{3p}{p^2}$

(b) $\frac{12x}{16xy}$

(c) $\frac{2x + 4}{x^2 - x - 6}$

(d) $\frac{x^2 + 5x + 4}{x^2 + 2x - 8}$

3. Solve these simultaneous equations

(a) $2x + 5y = 24$

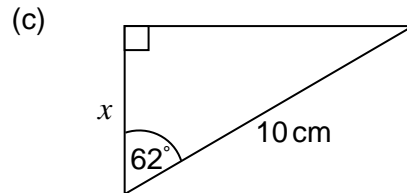
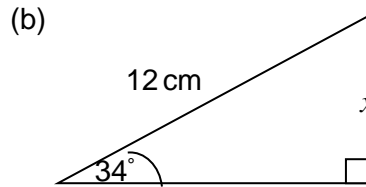
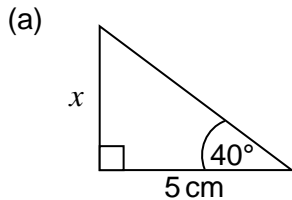
$4x + 3y = 20$

(b) $3a - b = 9$

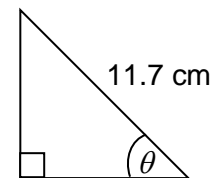
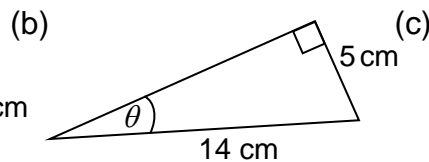
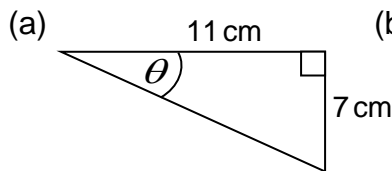
$2a + 2b = 14$

Section E: Pythagoras/Trigonometry

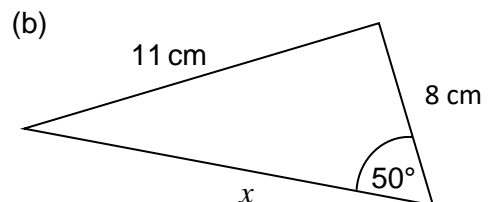
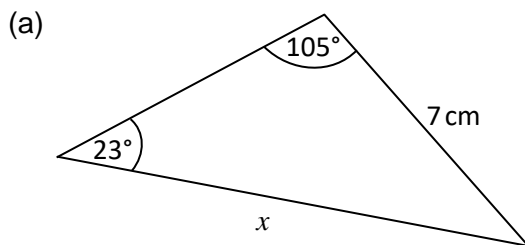
- Calculate the **distance** between the points (3,5) and (7,12).
- Find the missing sides marked x .



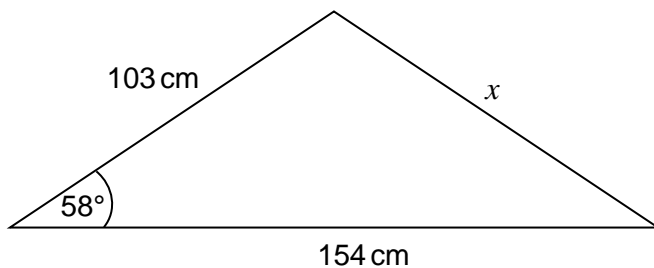
- Find the missing angles θ



- Use the sine rule to find x .



- Use the cosine rule to find x .





Task 2: Research

Mathematical Notation and Symbols

Find out what the following mathematical notation or symbols mean

1) $n!$

5) $\binom{n}{r}$

9) \mathbb{Q}

2) \int

6) \bar{x}

10) \mathbb{Z}

3) $|x|$

7) \mathbb{R}

11) $f(x)$

4) Σ

8) \mathbb{N}

12) i



Researching some A-Level Maths Topics

Research the following A-level maths topics – your answers must be written in your own words (not just copied and pasted), with references made to which text book or website you have used. You may include examples if you wish. This task should be no more than 1000 words long.

1. What is differentiation in maths? What do we use it to find? What are the rules?
2. What is integration in maths? What do we use it to find? What are the rules?
3. What is the trapezium rule? What is it used for? How do we use it?
4. What is a recurrence relation?