

Tudor Grange Academy Redditch



A-Level Maths Pre-Course Learning Materials

Name: _____

Welcome from the Head of Maths

Dear Student,

Thank you for choosing to study Mathematics in the Sixth Form at Tudor Grange Academy Redditch. Your A-level Mathematics will be assessed in three examination papers at the end of year 13, covering pure maths, statistics and mechanics. The maths department at TGAR is committed to ensuring you make good progress throughout your course, and as such we have prepared this booklet.

It is vitaly important that you are confident with the topics that are covered in this document (which are all from GCSE) before you begin your course in September. These are the key foundations to all of the A-level materials. Work through the questions, using the online tutorials to help you where required.

Once you have done all of that please bring the completed assessment on the first day back in September. Your teacher will mark this and return it to you in time to prepare for your first assessment, which will also cover key skills used in the early part of the A-level course. Any students who fail to achieve the minimum required standard in these core skills will receive compulsory intervention to ensure that they do reach such standards.

As a department we look forward to seeing you in September.

Yours sincerely

Mr B. Hampton
Head of Mathematics

M,	Topic	Corbett Maths	Just Maths
1a	Adding and Subtracting Fractions	133	
b	Dividing Fractions	134	
2a, d, e	Simplifying Expressions	174	48
2b	Expanding Brackets	13 , 14	52, 53
2c	Factorising Expressions	118	54
3, 4a	Fractional Indices	173 , 175	
4b	Simplifying Surds	305	
5	Rationalising the Denominator	307	
6	Simplifying Algebraic Fractions	24	
7	Expanding and Factorising	13 , 14 , 118	52, 53, 54
8, 9, 10a	Coordinate Geometry	196	
10b	Algebraic Fractions	24	
11	Trigonometry (Non-Right Angled)	335 , 336	
12	Transformation of Graphs	323 , 324	
13	Trigonometry (Area)	337	
14	Sectors of Circles		
15	Simultaneous Equations (Linear)	295	
16	Simultaneous Equations (Quadratic)	298	

The topics for questions 1-16 in your assessment are listed above. The videos listed will help you if you are not able to complete the question.

The websites are:

- corbettmaths.com
- justmaths.com

Question 17 is meant to be an open ended question. We are interested in how you tackle the problem as much as the final answer that you achieve. Spend time doing as much maths as possible and discuss what you have found. You should write at least 2 sides of A4 for this.

Marks will be awarded for the following:

Making and monitoring decisions (4 marks)

Communicating mathematically (2 marks)

Mathematical reasoning (4 marks)

Assessed Assignment

Complete the following questions to be submitted to your teacher during the first week of term. There are 17 questions. The total number of marks available is 80.

1. (a) Work out $\frac{1}{3} + \frac{3}{5}$

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(2)

(b) Work out $2\frac{1}{4} \div \frac{3}{5}$

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(3)

(Total 5 marks)

2. (a) Simplify $k^5 \div k^2$

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(1)

(b) Expand and simplify

(i) $4(x + 5) + 3(x - 7)$

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(ii) $(x + 3y)(x + 2y)$

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(4)

(c) Factorise $(p + q)^2 + 5(p + q)$

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(1)

(d) Simplify $(m^{-4})^{-2}$

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(1)

(e) Simplify $2t^2 \times 3r^3t^4$

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(2)

(Total 9 marks)

3. (a) Find the value of $36^{\frac{1}{2}}$

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(1)

(b) Find the value of $8^{-\frac{2}{3}}$

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(2)

(Total 3 marks)

4. (a) Write down the value of $49^{\frac{1}{2}}$

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(1)

(b) Write $\sqrt{45}$ in the form $k\sqrt{5}$, where k is an integer.

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(1)

(Total 2 marks)

5. Work out

$$\frac{(5 + \sqrt{3})(5 - \sqrt{3})}{\sqrt{22}}$$

Give your answer in its simplest form.

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(Total 3 marks)

6. Simplify fully $\frac{2x^2 + 3x + 1}{x^2 - 3x - 4}$

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(Total 3 marks)

7. Show that $(2a - 1)^2 - (2b - 1)^2 = 4(a - b)(a + b - 1)$

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(Total 3 marks)

8. A straight line has equation $y = \frac{1}{2}x + 1$

The point P lies on the straight line.
 P has a y -coordinate of 5.

(a) Find the x -coordinate of P .

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(2)

(b) Rearrange $y = \frac{1}{2}x + 1$ to make x the subject.

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(2)

(Total 4 marks)

9.

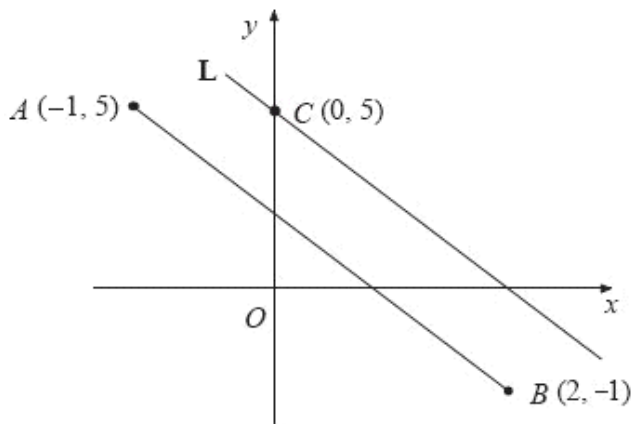


Diagram **NOT** accurately drawn

The diagram shows three points $A(-1, 5)$, $B(2, -1)$ and $C(0, 5)$.
The line L is parallel to AB and passes through C .

(a) Find the equation of the line L .

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(4)

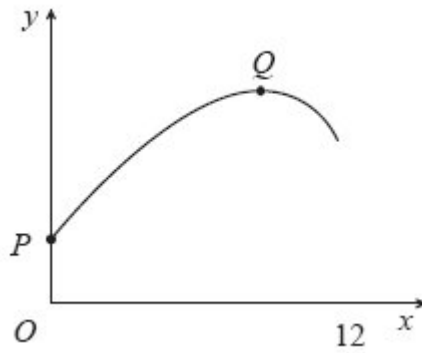
The line M is perpendicular to AB and passes through (0, 0).

- (b) Find the equation of the line M.

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(2)
(Total 6 marks)

10. Here is a sketch of the graph of $y = 25 - \frac{(x-8)^2}{4}$ for $0 \leq x \leq 12$



P and Q are points on the graph.

P is the point at which the graph meets the y-axis.

Q is the point at which y has its maximum value.

- (a) Find the coordinates of

- (i) P,
(ii) Q.

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(3)

(b) Show that $25 - \frac{(x-8)^2}{4} = \frac{(2+x)(18-x)}{4}$

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(3)
(Total 6 marks)

11.

In triangle ABC ,
 $AC = 8$ cm,
 $BC = 15$ cm,
 Angle $ACB = 70^\circ$.

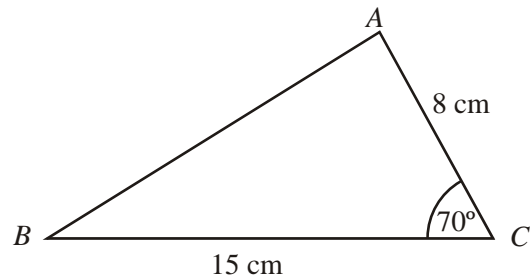


Diagram **NOT** accurately drawn

- (a) Calculate the length of AB .
 Give your answer correct to 3 significant figures.

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(3)

- (b) Calculate the size of angle BAC .
 Give your answer correct to 1 decimal place.

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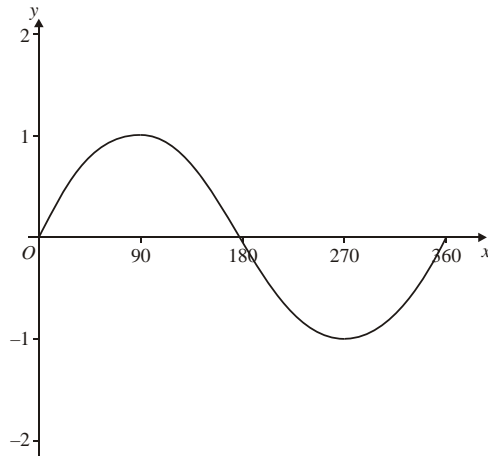
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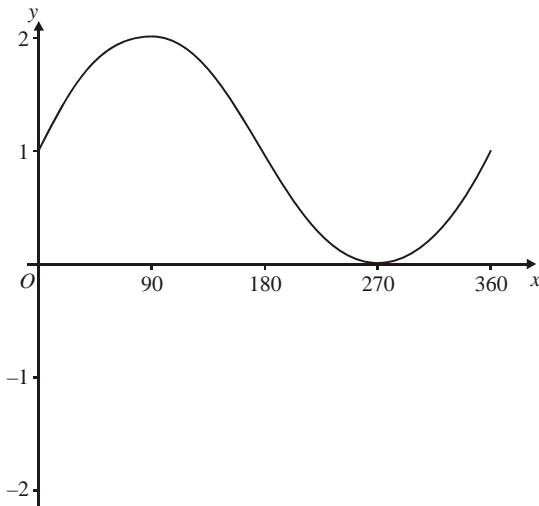
(2)
(Total 5 marks)

12. A sketch of the curve $y = \sin x^\circ$ for $0 \leq x \leq 360$ is shown below.



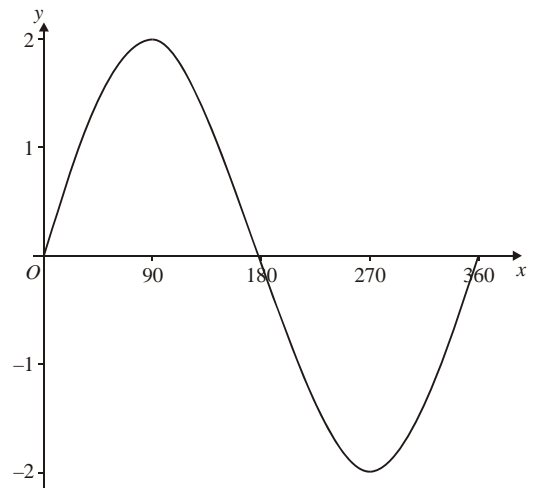
(a) Using the sketch above, or otherwise, find the equation of each of the following two curves.

(i)



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(ii)



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(2)

(b) Describe fully the sequence of two transformations that maps the graph of $y = \sin x^\circ$ onto the graph of $y = 3 \sin 2x^\circ$

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(3)

(Total 5 marks)

13. The diagram shows an equilateral triangle.

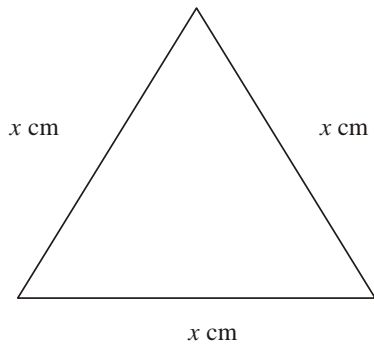


Diagram **NOT** accurately drawn

The area of the equilateral triangle is 36 cm^2 .

Find the value of x .

Give your answer correct to 3 significant figures.

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(Total 3 marks)

14.

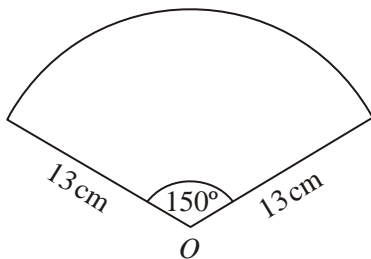


Diagram **NOT** accurately drawn

The diagram shows a sector of a circle, centre O .

The radius of the circle is 13 cm.

The angle of the sector is 150° .

Calculate the area of the sector.

Give your answer correct to 3 significant figures.

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(Total 2 marks)

15. Solve

$$\begin{aligned}2x - 3y &= 11 \\5x + 2y &= 18\end{aligned}$$

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(Total 4 marks)

16. Find the solutions to the simultaneous equations

$$\begin{aligned}x - 2y &= 1 \\x^2 + y^2 &= 13\end{aligned}$$

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(Total 7 marks)

