SIXTH FORM ENTRANCE EXAMINATION MATHEMATICS

Format Guidance

The test will comprise of between **10 and 15 questions,** to be answered in 45 minutes. All questions should be completed, supported with full and clear working out. Without sufficient working, correct answers may be awarded no marks. Calculators may be used, but are not provided, so candidates must ensure that they bring their own. Questions will be of Higher Tier GCSE standard, with some requiring the application of familiar content in unfamiliar contexts.

Topic Guidance

Number and Algebra

Number facts to find value of numbers

Algebraic fractions

Linear simultaneous equations

Solving quadratic equations

Linear inequalities

Changing subject of formula

Simplifying expressions with brackets

Simplifying expressions with indices

Sequences and n^{th} term expressions

Equation of a straight line

Shape and space

Solving area and perimeter problems of irregular shapes

Area calculation using circles

Using Pythagoras' theorem and trigonometry to solve problems involving right angled triangles

Angle reasoning

Handling Data

Tree diagrams

Probability calculations

Sample Question 1

Solve $\dfrac{x+2}{3x} + \dfrac{x-2}{2x} = 3$

(Total for question is 3 marks)
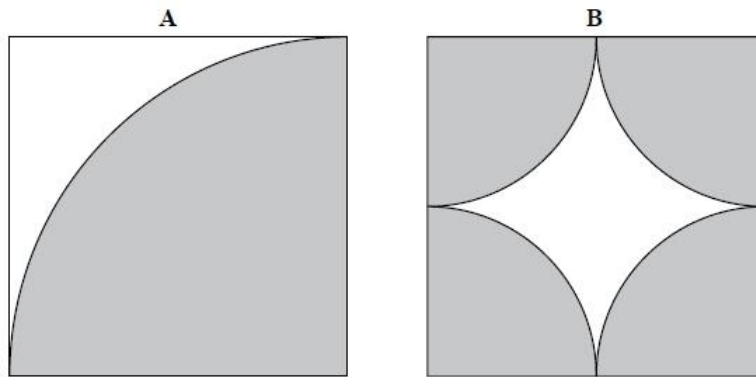
Sample Question 2

Diagram **A** shows a quarter of a circle shaded inside the square.
Diagram **B** shows four identical quarter circles shaded inside the square.

Show that the area of the region shaded in diagram **A** is equal to the area of the region shaded in diagram **B**.

(Total for question = 3 marks)

Sample Question 3

Here are the first six terms of a Fibonacci sequence.

$$1 \quad 1 \quad 2 \quad 3 \quad 5 \quad 8$$

The rule to continue a Fibonacci sequence is,

the next term in the sequence is the sum of the two previous terms.

(a) Find the 9th term of this sequence.

(1)

The first three terms of a different Fibonacci sequence are

$$a \quad b \quad a + b$$

(b) Show that the 6th term of this sequence is $3a + 5b$

(2)

Given that the 3rd term is 7 and the 6th term is 29,

(c) find the value of a and the value of b.

(3)

(Total for question = 6 marks)