



Name	
Current School	

Mathematics

Entrance exam for: 16+ (Sample)

Time allowed: 45 minutes

Total marks: 50

Please read this information before the examination starts

- Answer **all** questions
- Please write your solutions on the question paper and, where relevant, in the designated space.
- You may **not** use a calculator.

This paper is designed for all Sixth Form applicants. It is therefore split into two sections of generally increasing difficulty.

Section A (20 marks)

Section A is designed to test core skills and understanding. You should answer each question in the answer box on the right-hand side.

Section B (30 marks)

Section B contains a greater element of problem solving. It contains a mixture of multiple choice and written answer questions. You should complete the written answer questions in the space provided and you will be marked on the presentation of your written work in addition to your final solution; answers without supporting work/calculations may not score full marks.

For office use only

Marks awarded:	
Comments:	

Section A

Each of the following questions are worth 1 mark

Write your answers down the right-hand side

		Answer
1	Calculate $873 + 148$	
2	Calculate 435×7	
3	Calculate $\frac{2}{3} + \frac{1}{6} - \frac{1}{12}$	
4	Calculate $5 \times \frac{7}{3}$	
5	Find the value of 4^{-2}	

6	Find the value of $\left(\frac{4}{9}\right)^{\frac{1}{2}}$	
7	Solve $2x + 7 = 11$	
8	Solve $\frac{3}{x} = 5$	
9	Fully simplify $\frac{5ab}{15a+10a^2}$	
10	Solve $4n - 1 \leq 8$	

Each of the following questions are worth 2 marks.

Write your answers down the right-hand side.

		Answer
11	If $a = 7, b = -3$ and $c = 2$, find the value of $\frac{a-2c+b^2}{3}$	
12	Solve $5(3b - 4) = 22 - 6b$	
13	Expand and simplify $5(4y + 5) - 3(5y - 1)$	

14

Make k the subject of the equation $2p = \frac{7k-3}{8}$

15

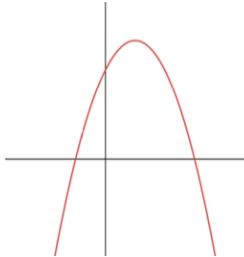
A line parallel to $y = 4x + 1$ passes through the point $(0, -5)$.
What is its equation?

Section B

Each of these multiple choice questions is worth 2 marks.

If you give an incorrect answer you will be **deducted 1** mark.

Write your answer by putting the relevant letter on the right hand side.

		Answer
1	<p>Which of the following equations is most likely to be shown in the graph below?</p>  <p>A: $y = (x + 3)(x + 1)$ B: $y = (x + 3)(x - 1)$ C: $y = (x - 3)(x + 1)$ D: $y = (x - 3)(x - 1)$</p>	
2	<p>If two of the sides of a right-angled triangle are 5 cm and 6 cm long, how many possibilities are there for the length of the third side?</p> <p>A: 0 B: 1 C: 2 D: 3</p>	
3	<p>Which of the following lines does the point (3, -6) lie on?</p> <p>A: $y = x + 8$ B: $y = x - 9$ C: $y = 2x + 4$ D: $y = 3x$</p>	

4	<p>Write</p> $x^2 + 4x + 3$ <p>In the form</p> $(x + p)^2 + q$ <p>A: $(x + 2)^2 - 4$ B: $(x + 2)^2 - 3$</p> <p>C: $(x + 2)^2 - 1$ D: $(x + 2)^2 - 7$</p>	
5	<p>One of the following is the largest of nine consecutive positive integers whose sum is a perfect square. Which one is it?</p> <p>A: 118 B: 128 C: 138 D: 148</p>	

For the following questions you should show all of your working clearly.

Correct answers without working may not receive full marks.

6 Solve the following pairs of simultaneous equations

[5]

$$\begin{aligned}2x - y &= -2 \\ y &= 2x^2 - 3x - 10\end{aligned}$$

.....

7

(a) Show that

[2]

$$\left(1 + \frac{1}{x}\right)\left(1 - \frac{2}{x+1}\right) \equiv \frac{x-1}{x}$$

(b) Hence, or otherwise, solve

.....

[3]

$$\left(1 + \frac{1}{x}\right)\left(1 - \frac{2}{x+1}\right)\left(1 + \frac{2}{x-1}\right) = \frac{1}{4}$$

.....

8 Two positive numbers are 10 and x .

- (a) The mean of 10 and x is 30% less than one of the numbers.
Find the 2 possible values of x .

[3]

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- (b) In each case, by what percentage is the mean greater than the lower number?

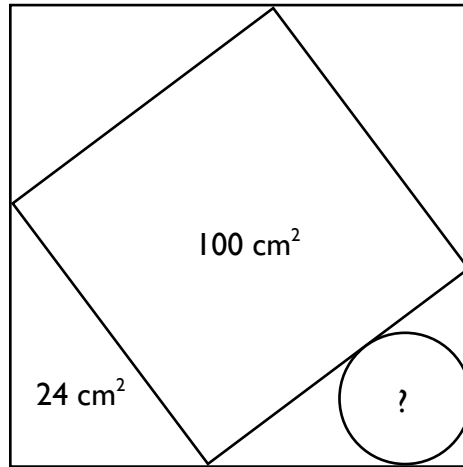
[2]

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- 10 The square, circle and triangle are stacked inside a larger square.
The area of the smaller square is 100 cm^2 .
The area of the triangle is 24 cm^2 .

[5]

The area of the circle is $a\pi$, where a is an integer. Find a .



End of Exam

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