CATERHAM
SCHOOL

13+ MATHS SAMPLE QUESTIONS

13+ Entrance Examination
(For Entry into Year 9)

1 Hour (Non Calculator)

s Examination information

The entrance examination is 4 hour long. Calculators are not allowed.

Skills questions (all non-calculator)

Number:

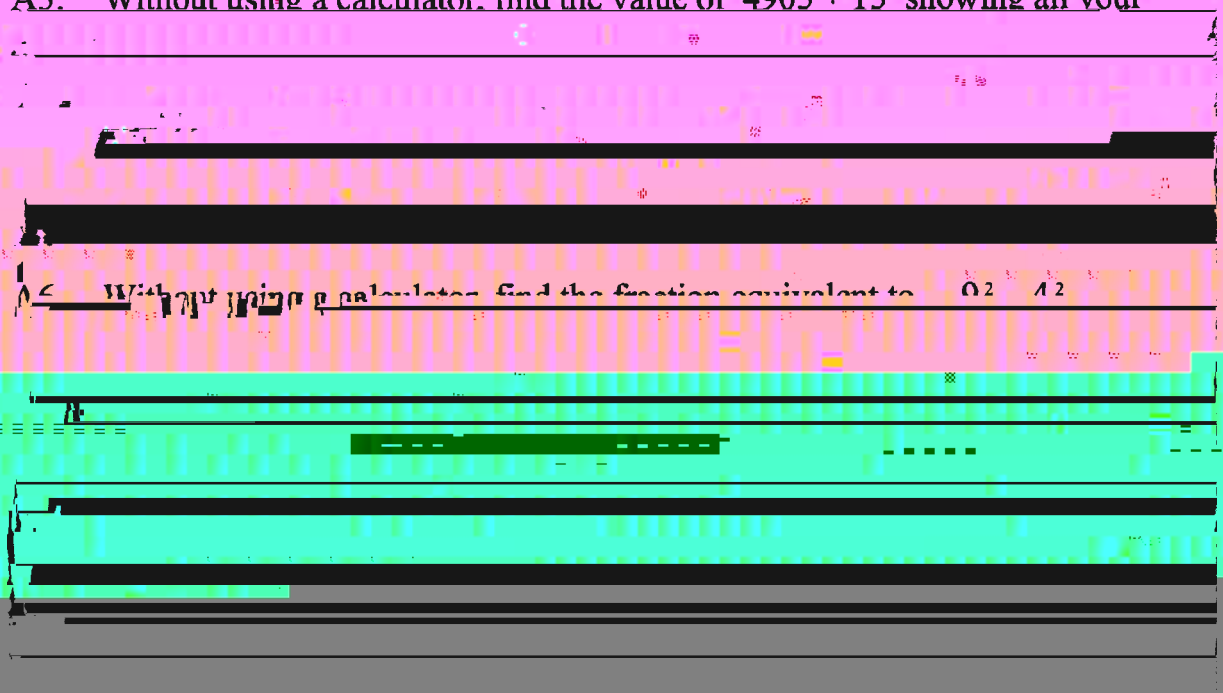
A1. Calculate 12% of £650.

A2. Work out the value of $(8-2)^2 - 3\times 2$

A3. Express 300 as a product of prime factors using index notation.

A4. Without using a calculator, find the value of 3.23×1.4 showing all your working.

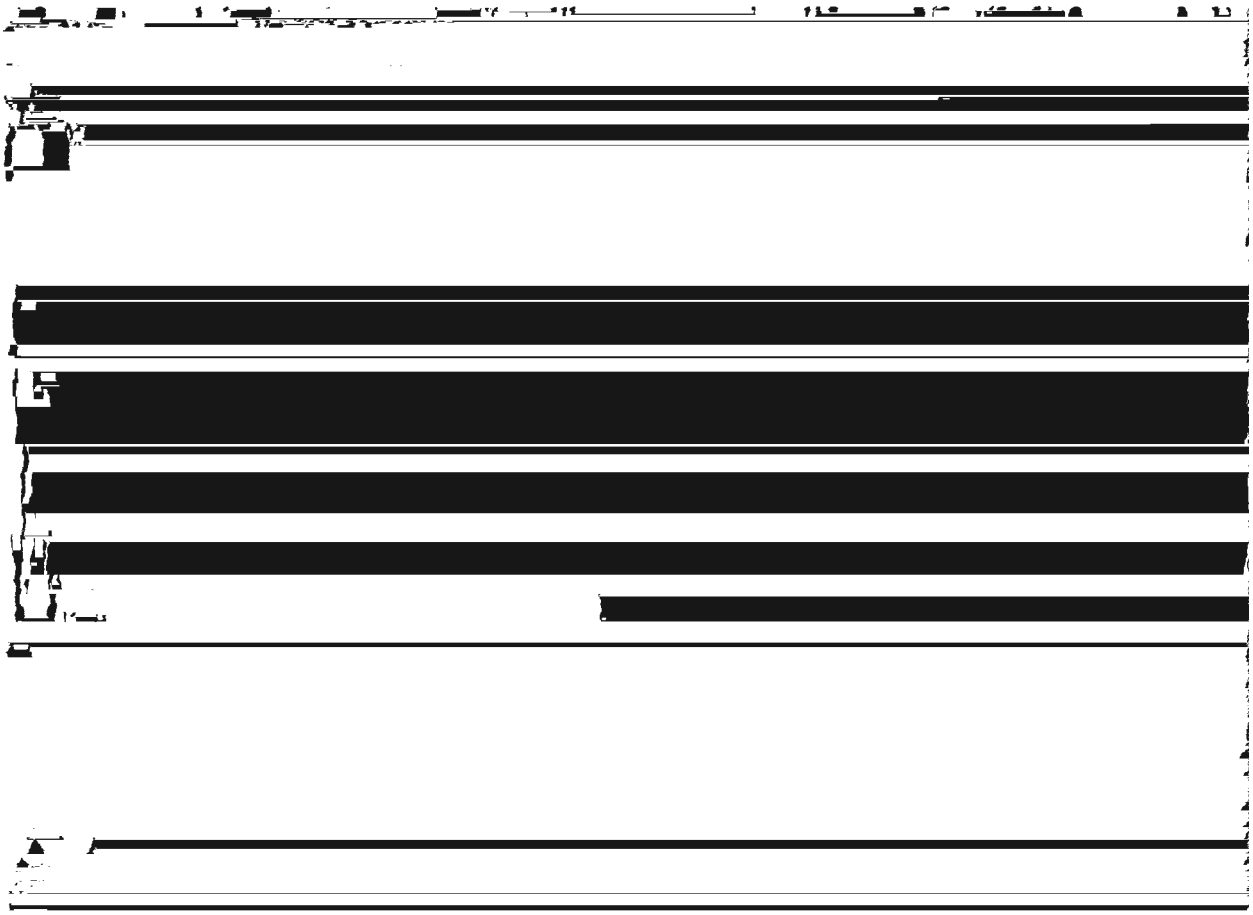
A5. Without using a calculator, find the value of $4905 \div 15$ showing all your



A6. Without using a calculator, find the fraction equivalent to $0.2 \cdot 4^2$

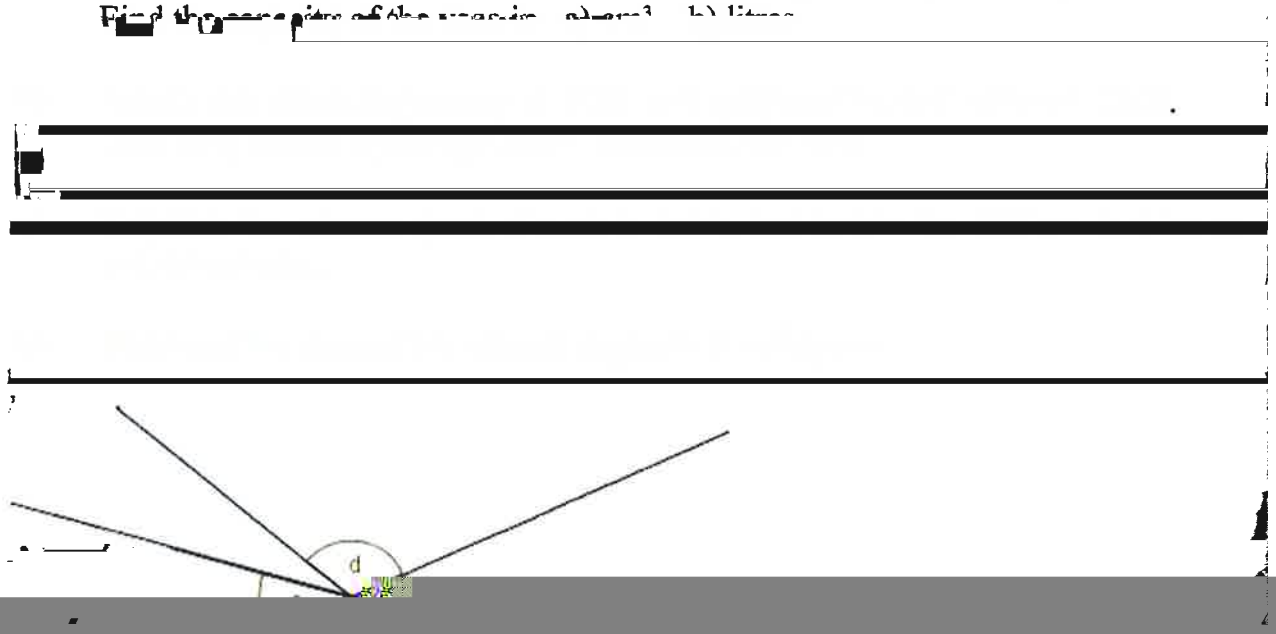
Algebra

A1. Simplify $3a + 5a - 7a$.



Shape, Space and Measures:

A1. A vase is made in the shape of a cuboid measuring 6 cm by 6 cm by 25 cm.



A2. A train sets off on its journey at 1057 and arrives at its destination at 1309
How long does the journey take in hours and minutes?

A3. Calculate the average speed of a car in km/h that travels for 330 km in 3 hours and 45 minutes.

Handling Data:

A1. The table below shows the results of a traffic count.
Construct a pie chart of this data showing your calculations clearly.

BMW	19
Toyota	22
Other	17

A2. For this list of numbers, find the mean, the median, the mode and the range:

12, 4, 15, 3, 8, 4, 3, 11, 20, 3, 5

A3. The frequency table shows the results of rolling a die 50 times:

Score	1	2	3	4	5	6
Frequency	7	13	10	10	2	8

Calculate the mean score.
Is the die fair? Give a reason for your answer.

A4. A bag contains some coloured balls

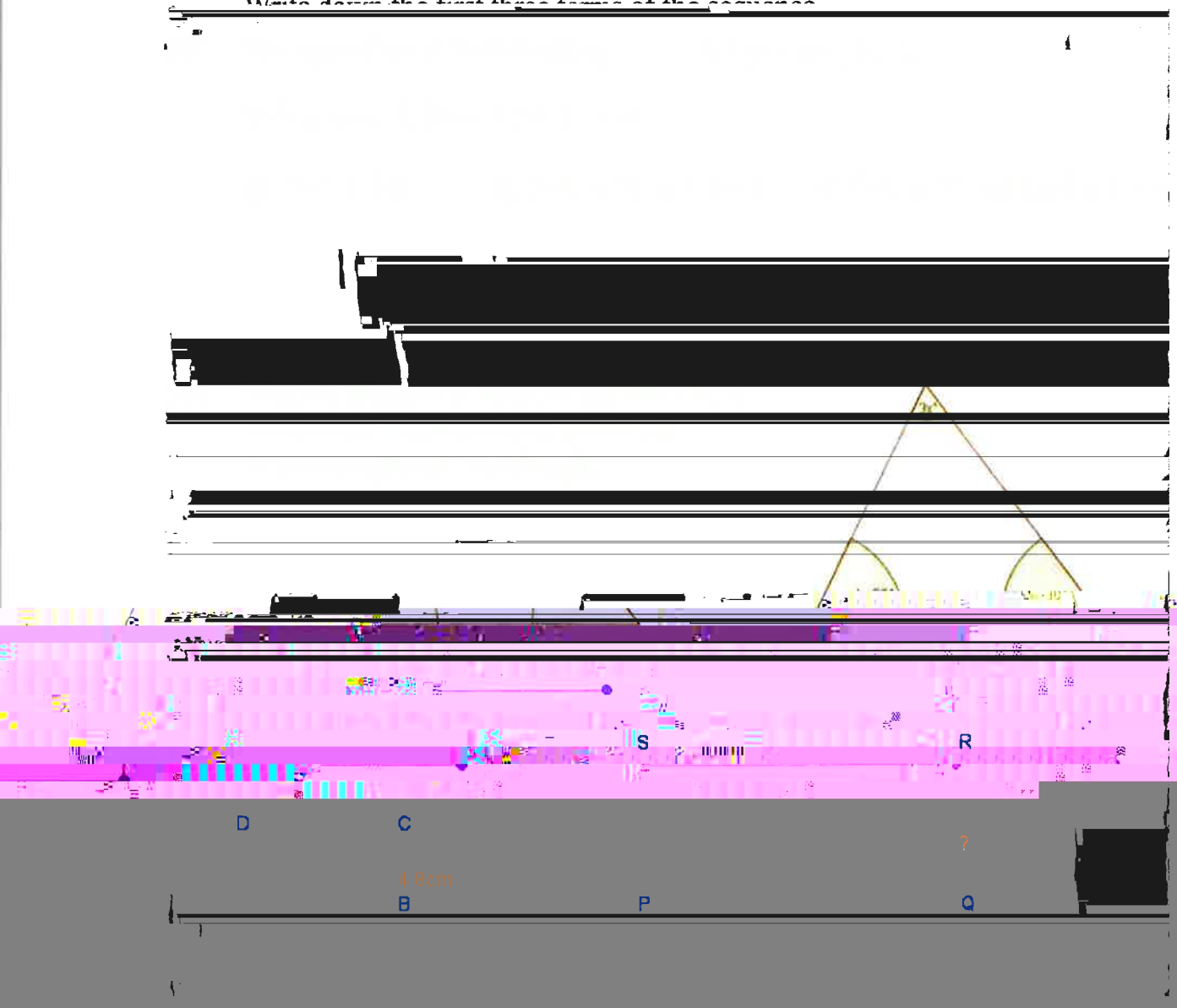
Problem Solving Questions (non-calculator):

Number

B1. The organisers of a concert hope to sell 22,000 tickets to the nearest 500. What is the minimum number of tickets they hope to sell?

B1. The n^{th} term of a sequence is $3n^2 + 5$.

Write down the first three terms of the sequence



Handling Data:

B1. A paperboy's sales during a certain week were: Monday 84, Tuesday 112, Wednesday 108, Thursday 95 and Friday 131.

Find the average daily sales.

When the sales for Saturday were included the daily average increased to 128. How many papers were sold on Saturday?

Additional problems:

B1. Write down the n^{th} term of this sequence: $\frac{1}{1}, \frac{4}{3}, \frac{9}{5}, \frac{16}{7}, \frac{25}{9}, \frac{36}{11}, \ldots$

B2. A square matrix is an array of numbers like this: $\begin{bmatrix} 3 & 7 \\ 2 & 1 \end{bmatrix}$.

We can multiply these arrays together like this:

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix} = \begin{bmatrix} 1\times5+2\times7 & 1\times6+2\times8 \\ 3\times5+4\times7 & 3\times6+4\times8 \end{bmatrix} = \begin{bmatrix} 19 & 22 \\ 43 & 50 \end{bmatrix}$$

a) Work out $\begin{bmatrix} 1 & -1 \\ 2 & 0 \end{bmatrix} \times \begin{bmatrix} 3 & 0 \\ -1 & 2 \end{bmatrix}$.

b) Find the values of x and y if $\begin{bmatrix} x & -2 \\ 7 & 5 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Answers to sample questions

Skills:

Number

A1 £78

A2 30

A3 $3\times2^2\times5^2$

A4 4.522

A5 327

A6 4 11/15

A7 432.9

A8 0.625, 62.5%

A9 70

A10 6

A11 36:54:72

A12 4.8kg

Algebra

A1 a

A2 $13a-6b$

A3 -30, 12, -4.8

A4 $P = 2a+2b$

A5 2/3

A6 1

A7 12

A8 23, 30, 38

A9 $t_n = 3n + 2$

A10 x=12

Shape, Space, and Measures

A1 900 cm³/0.9 L

A2 2 h 12 m

A3 88 km/h

A4 a=50°, b=30°, c=100°, d=100° e=130°

A5 pentagon, 540°

A7 616 cm²

Handling data

A1 F128°, B76°, T88°, O68°

A2 mean 8, median 5, mode 3 range 17

A3 3.22, would expect mean 3.5, so this appears close, so not biased OR would expect around 8 fives and we only get 2, so appears biased.

A4 1/3

A5 1/6

A6 8

Problem solving

Number

B1 21 750

B2 22 , 2 5 50

B3 £24800

Algebra/Shape&Space

B1 8, 17, 32; 7th

B2 16, -2, -1

B3 70°, 75°, 35°

B4 86.4cm

Handling data

B1 106, 238

B2 66.4 kg

B3 mode 0, median 2, mean 2 1/17

Additional questions

B1 $n^2/(2n-1)$

B2 [4 -2] [6 0]

x=5, y=3