SEVENOAKS SCHOOL

YEAR 9 (13+) ENTRANCE EXAMINATION

April 2017
for entry in September 2018

MATHEMATICS

Your Name: _____

Your School: _____

Time allowed: 1 hour

Equipment needed: Pen, pencil, eraser, ruler.

Information for candidates:

1. Calculators are NOT allowed.
2. Write your name and school on this page.
3. Write your answers on the question paper in the space provided.
4. There are 17 questions in this paper, try to answer all of them, but don't worry if you don't complete the paper. If you get stuck, just go on to the next question and if you have time at the end come back to the one(s) you left.
5. There are 60 marks in total available for this paper. Marks for each question are shown in square brackets [ ] after the question.
6. Show all your working. You may be awarded marks for correct working even if your final answer is incorrect, and a correct answer unsupported by correct working may not receive full marks.

1. The Mathematics department places the following stationery order:

6 boxes of 30 compasses at £9.99 per box
12 packs of 20 rulers at £4.75 per pack
20 packs of 6 protractors at £1.49 per pack

a) How much does the department spend on

(i) compasses?

_____ [1 mark]

(ii) rulers?

_____ [1 mark]

(iii) protractors?

_____ [1 mark]

b) The department has a stationery budget of £200. How much of the budget does it have left to spend after the above order has been paid for?

_____ [2 marks]

2. Calculate

a) $2\frac{2}{3} \times 3\frac{1}{4}$

_____ [2 marks]

b) $\frac{1}{3} \div \frac{2}{5}$

_____ [2 marks]

3. All the pupils at a primary school come from one of three villages: Elmswell, Haughley or Woolpit. $\frac{1}{4}$ of the pupils come from Elmswell. $\frac{3}{5}$ of the pupils come from Haughley. 102 pupils come from Woolpit.

How many pupils are there in total at the school?

_____ [2 marks]

4. An athletics club has junior (i.e. boy or girl) members and adult members. The ratio of girls to boys to adults is 3:4:9 and there are 36 adult members.

In total, how many members does the club have?

_____ [2 marks]

5. a) Write 5.696 correct to 2 decimal places.

_____ [1 mark]

b) Write 24.447 correct to 3 significant figures.

_____ [1 mark]

6. Boxes of eggs containing broken eggs cannot be sold in shops. The table below shows how many boxes of Grade A eggs and Grade B eggs could not be sold in a week at one shop.

Grade	Monday	Tuesday	Wednesday	Thursday	Friday
A	14	16	16	13	16
B	14	12	9	11	15

a) Calculate the mean and range of each Grade of egg.

Grade A mean = _____ [1 mark]

Grade A range = _____ [1 mark]

Grade B mean = _____ [1 mark]

Grade B range = _____ [1 mark]

b) Use these statistics to compare the two Grades. Which Grade would you recommend the shopkeeper to stock? **Give a reason.**

_____

_____

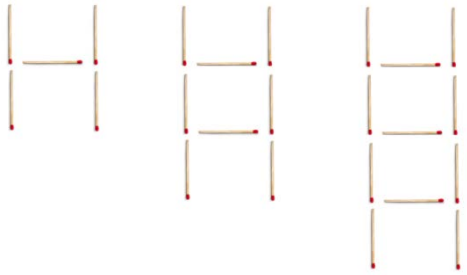
_____ [2 marks]

7. The pupils in Year 7 at a secondary school are arranged into 16 equally sized classes for Geography and 20 equally sized classes for Music.

Use prime factors to work out the smallest number of pupils there could be in Year 7.

_____ [2 marks]

8. Here is a sequence of matchstick patterns:



a) Write an algebraic expression for the number of matchsticks in the nth pattern in the sequence.

_____ [2 marks]

b) Hence, or otherwise, find the number of matchsticks needed for the 8th pattern in the sequence.

_____ [2 marks]

c) If you have 100 matchsticks and make the largest pattern possible, how many matchsticks are not used.

_____ [2 marks]

9. Solve each of the following equations.

a) $\frac{x}{5} = 25$

_____ [1 mark]

b) $3x + 4 = -2$

_____ [1 mark]

c) $3(3x + 7) = 48$

_____ [2 marks]

d) $9x + 14 = 2(x - 7)$

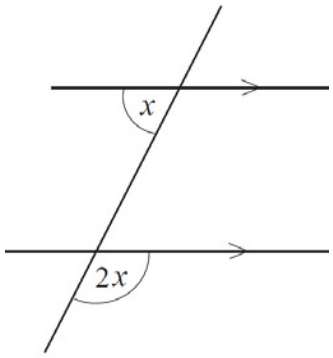
_____ [2 marks]

e) $\frac{x+5}{4} = \frac{x-3}{3}$

_____ [2 marks]

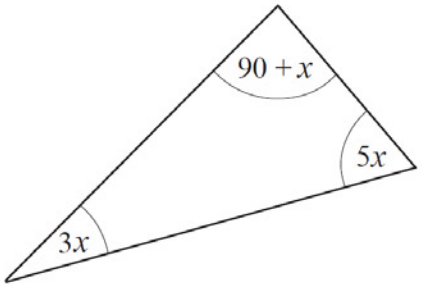
10. For each diagram, write an equation in terms of x, and solve it to find x.

a)



_____ [2 marks]

b)



_____ [2 marks]

11. Wayne thinks of a number, multiplies it by three and then adds 10. His answer is 11 more than the number he originally thought of. If x is his original number, write an equation in terms of x and solve it to find x.

_____ [2 marks]

12. Granny swears that she is getting younger. She has calculated that she is four times as old as I am now, but remembers that 5 years ago she was five times as old as I was at that time. What is the sum of our ages now?

_____ [2 marks]

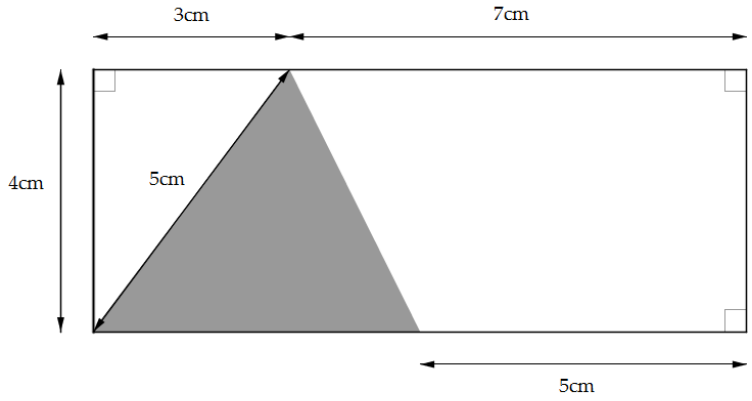
13. Some rectangular pieces of paper, all the same size, are placed in a pile. The pile is then folded in half to form a booklet. The pages are numbered in order 1, 2, 3, 4,… from the first page to the last page.

On one of the sheets of paper, the sum of the numbers on the four pages is 58.

How many sheets of paper were there at the start?

_____ [3 marks]

14. The rectangle below is divided into two triangles and a trapezium.



a) Find the area of the shaded triangle.

_____ [1 mark]

b) Find the area of the trapezium.

_____ [2 marks]

c) Express the area of the trapezium as a percentage of the total area of the rectangle.

_____ [2 marks]

15. One morning the hour hand of a clock is pointing directly at the 38-minute mark.

At what time does this occur?

_____ [2 marks]

16. $J6K4 \times 7 = L9M98$

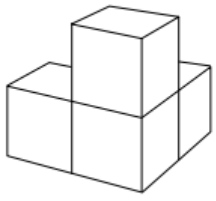
Each of J, K, L and M is a different digit.

Find the values of J, K, L and M.

_____ [2 marks]

17. Jahnvi has four cubes all the same size: one blue, one red, one white and one yellow. She wants to glue the four cubes together to make the solid shape shown.

How many differently-coloured shapes can Jahnvi make? (Two shapes are considered to be the same if one can be picked up and turned around so that it looks identical to the other.)



_____ [3 marks]

Total: 60 marks