SEVENOAKS SCHOOL

YEAR 9 (13+) ENTRANCE EXAMINATION

October 2013
for entry in September 2014

MATHEMATICS

Your Name: …….

Your School: …….

Time allowed: 1 hour

Equipment needed: Pen, pencil, eraser, ruler and calculator

Information for candidates:

1. Write your name and school on this page.
2. Write your answers on the question paper in the space provided.
3. There are 16 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.
4. There are 75 marks in total available for this paper. Marks for each question are shown in square brackets [ ] after the question.
5. 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.

Do not use your calculator for questions 1 and 2. Marks will only be awarded if clear working is shown.

1. Work out (remember to simplify fractions if possible)

a) $\frac{3}{4} - \frac{2}{5} =$

_____ [1]

b) $4\frac{2}{3} - 2\frac{1}{5} =$

_____ [2]

c) $2\frac{1}{5} \times \frac{4}{7} =$

_____ [2]

d) $\frac{9}{16} \div \frac{15}{8} =$

_____ [2]

e) $2.83 - 4.725 =$

_____ [1]

f) $3.8 \times 0.27 =$

_____ [2]

g) $3.6 \div 0.009 =$

_____ [2]

h) $2\frac{1}{2} \div 3 =$

_____ [2]

i) $\frac{4}{7} \times \frac{9}{20} \times \frac{14}{15} =$

_____ [2]

2. a) Show all working and calculate

$346 \times 27 =$

_____ [2]

b) Hence or otherwise state

(i) $0.346 \times 0.27 =$

_____ [1]

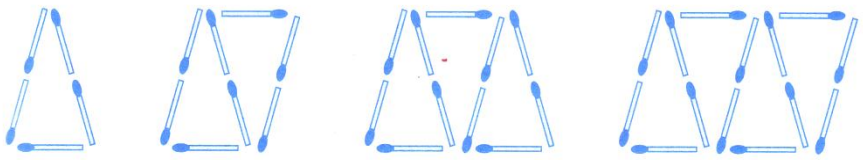
(ii) $3.46 \times 27000 =$

_____ [1]

3. I have two fair dice each numbered 1 to 6. I am going to throw the two dice. What is the probability that the sum of the numbers on the dice will be a square number?

_____ [2]

4. a) Here is a sequence of matches (m) and triangles (t). Find a formula connecting m and t.



_____ [1]

b) Find the n^{th} term of these sequences:-

(i) 3, 7, 11, 15, 19,……

_____ [2]

(ii) $1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, ...$

_____ [2]

5. Evaluate the following:

a) $13 - 8 \times 2 + 3 =$

_____ [1]

b) $2x^2 - 3y \qquad when \quad x = 3, \quad y = -2$

_____ [2]

c) $\dfrac{2 + \dfrac{1}{x}}{1 - \dfrac{1}{x}} \qquad when\ x = \dfrac{1}{2}$

_____ [2]

6. Solve

a) $3(x - 4) = x + 24$

$x =$ _____ [2]

b) $3x^2 = 108$

$x =$ _____ [2]

c) $3(3x - 1) + 2(x + 3) = 4(2x + 3)$

$x =$ _____ [2]

7. Simplify the following expressions

a) $-2(3x - 5)$

_____ [2]

b) $7(2x - 3) - 3(6x - 5)$

_____ [3]

8. a) Write 5 numbers so that the mean is 6, the median is 5 and the mode is 4.

_____ _____ _____ _____ _____ [2]

b) A teacher conducted a mental arithmetic test for 26 students and the marks out of 10 are shown in the table.

Mark	3	4	5	6	7	8	9	10
Frequency	6	3	1	2	0	5	5	4

i) Find the mean, median and mode.

mean _____ median _____ mode _____ [3]

ii) The teacher congratulated the class that 'over three quarters were above average'. Which average justifies this statement?

_____ [1]

9. Jason bought a jacket on sale for 50% off the original price and another 25% off the discounted price. If the jacket originally cost £88, what was the final sale price that Jason paid?

_____ [2]

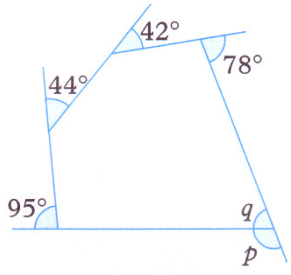
10. a) Fred and George share some money. If Fred gets $\frac{3}{11}$ of the money, in what ratio did they share it?

_____ [1]

b) Fred and George share some more money. If this time Fred gets 65% of the money, in what ratio did they share it? Give your answer in its simplest form.

_____ [1]

11. a) Find the angles marked with letters



p = _____ q = _____ [2]

b) Each interior angle of a regular polygon is 140^{o}. How many sides does the polygon have?

_____ [2]

12. An 800 seat multiplex cinema is divided into 3 theatres. There are 270 seats in Theatre 1, and there are 150 more seats in Theatre 2 than in Theatre 3. How many seats are in Theatre 2?

Theatre 2 _____ [3]

13. On her birthday Anna was given a bag of sweets to take to school.

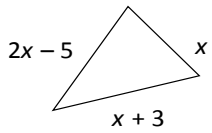
She had 4 lessons in the morning – in the first lesson she gave out half of the sweets in her bag and then gave one to the teacher. In the second lesson she gave out half of the sweets left in her bag and then gave one to the teacher. She repeated this in lessons 3 and 4. By the end of lesson 4 she had 1 sweet left. How many sweets were in the bag at the start of the day? Show all of your working.

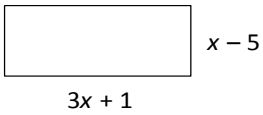
_____ [4]

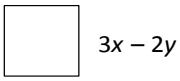
14. Bacteria in a petri dish double the area they cover every day. If the dish is covered after 16 days, on what day was only one quarter of it covered?

_____ [2]

15. Write down and simplify expressions for the perimeters of these shapes.

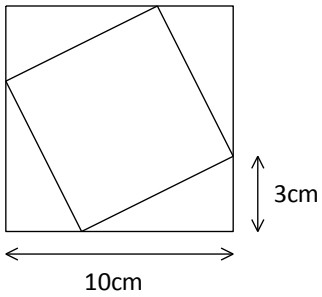






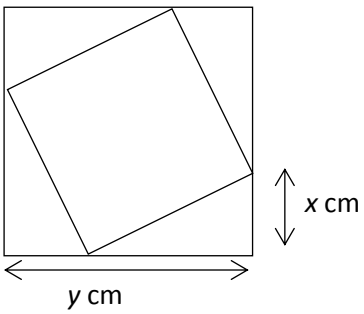
_____ _____ _____ [3]

16. a) There are 2 squares in the diagram. Find the area of the inner square.



_____ [3]

b) Find an expression for the area of the inner square. Simplify as far as possible.



_____ [3]

[Total: 75 marks]