SEVENOAKS SCHOOL

YEAR 9 (13+) ENTRANCE EXAMINATION

October 2014
for entry in September 2015

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 75 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.

Marks will only be awarded if clear working is shown.

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

a) $\frac{7}{12} - \frac{1}{8}$

_____ [1]

b) $5\frac{2}{8} - 3\frac{2}{3} =$

_____ [2]

c) $4\frac{1}{3} \times 1\frac{2}{11} =$

_____ [2]

d) $\frac{11}{15} \div \frac{1}{10} =$

_____ [2]

e) $3\frac{2}{5} \times \frac{10}{13} \times \frac{26}{35} =$

_____ [3]

2. Evaluate the following:

a) $4 \times -6 - -4 \times 4$

_____ [1]

b) 0.72×0.3

_____ [2]

c) $3x - 4y$ when $x = 3$ and $y = -2$

_____ [2]

d) $\frac{p(q-3)}{4}$ when $p = 2$ and $q = -7$

_____ [2]

3. Simplify the following expressions:

a) $7a^3 \times 3a^6$

_____[2]

b) $\frac{6a^2 \times a^2}{a^3}$

_____[2]

c) $\frac{12a^2bc^3}{3a^2c}$

_____[3]

4. Two spinners, with equal sectors, are numbered 0 through to 5. The two spinners are spun together and the difference between the scores is recorded.

a) Find the probability of obtaining a difference of 4.

_____ [2]

b) Find the probability of obtaining a difference of 5.

_____ [2]

c) What is the most likely number for the difference?

_____ [2]

5. Here are the first five terms of a number sequence:

3 7 11 15 19

a) Work out the 9^{th} term of the number sequence.

_____ [1]

b) Write down an expression, in terms of n, for the nth term of this number sequence.

_____ [2]

6. Solve

a) $2(x - 4) = x + 9$

$x =$ _____ [2]

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

$x =$ _____ [3]

7. Simplify the following expressions

a) $10(2 - 5x)$

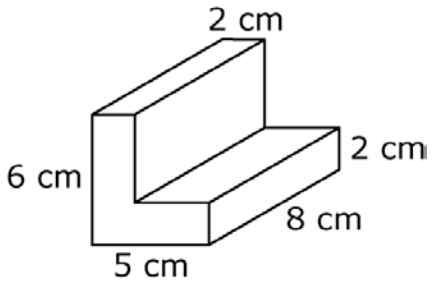
_____ [2]

b) $5(x - 3) - 3(9 - 2x)$

_____ [3]

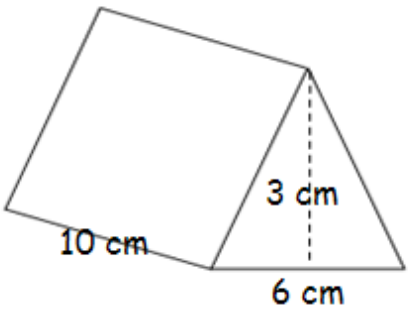
8. Calculate the volume of the shapes below

a)



_____ [2]

b)



_____ [2]

9. Amanda went into a shop and saw a dress on sale for 25% off the original price and another 10% off the discounted price. If the dress originally cost £88, what was the final sale price that Amanda paid?

_____ [3]

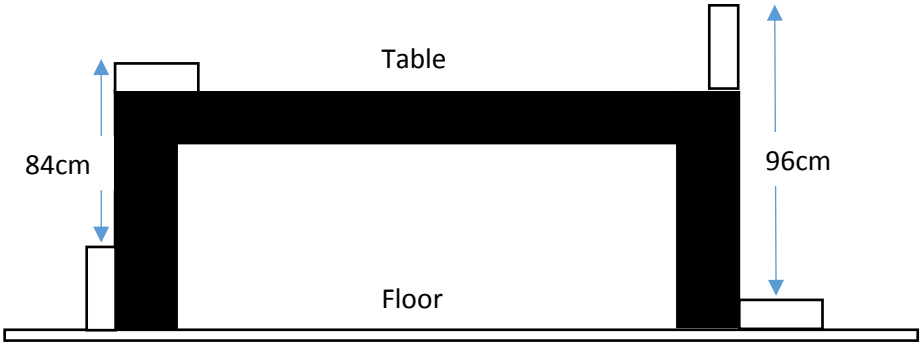
10. Jemima has to take twelve exams. After the first eleven exams her average mark was 79%. What mark must she score on the last exam to raise her average to 80%?

_____ [3]

11. Lee, Mike and Neil formed a syndicate to enter a giant lottery. They agreed to share their winnings in the ratio of their contributions. Lee paid £1, Mike paid 60p and Neil paid 25p. Together they won £1 480 000. How much did Neil get?

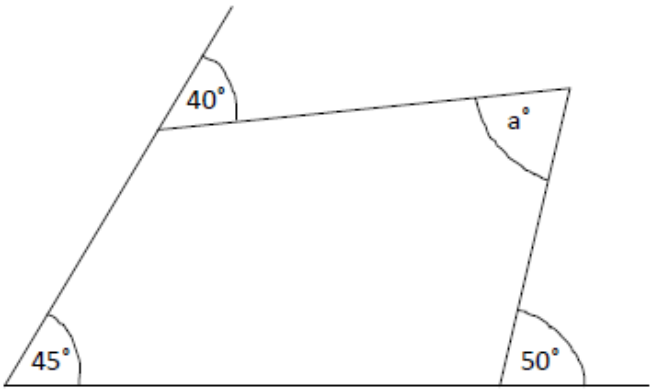
_____ [3]

12. Four identical blocks of wood are placed touching a table in the positions shown in this side-on-view. How high is the table?



_____ [3]

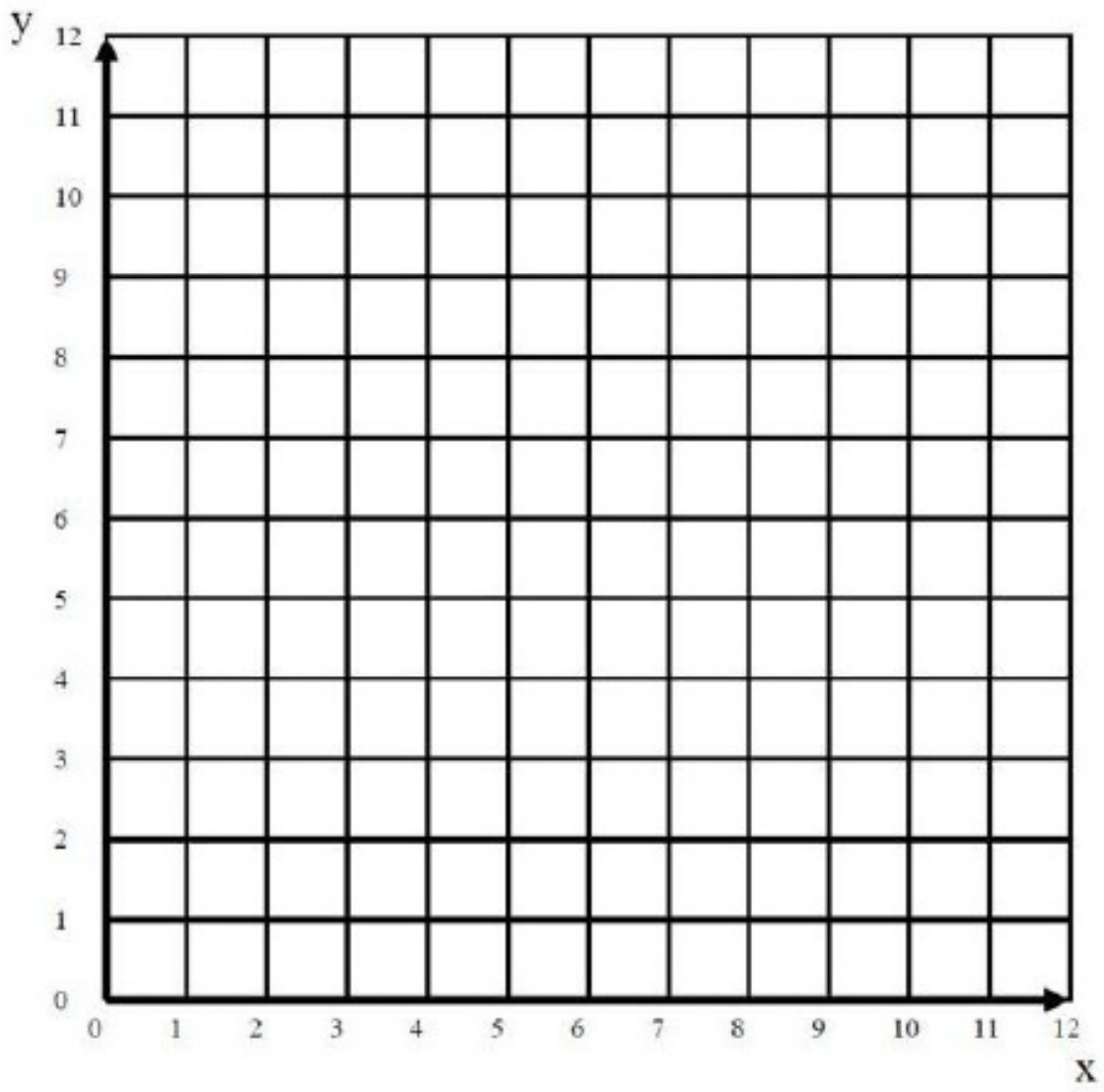
13. Calculate the angle a in the diagram below (diagram not drawn to scale):



_____ [2]

14. On the grid, plot the points A (1, 2), B (1, 5) and C (3, 5).

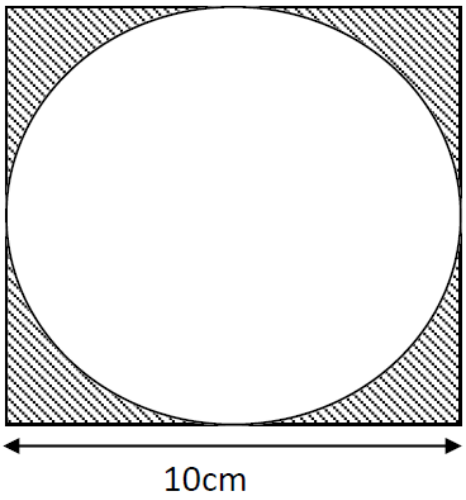
a) Join the points to form a triangle and label it A. [1]



b) Draw the line $y = x$ on the grid above, then reflect triangle A in this line. Shade and label the new triangle B. [2]

c) Using (4, 6) as the centre of rotation, rotate triangle A through 180°. Shade and label the image triangle C. [2]

15. The diagram shows a circle touching the inside edges of a square. Calculate the area of the shaded region. Leave your answer in terms of π.

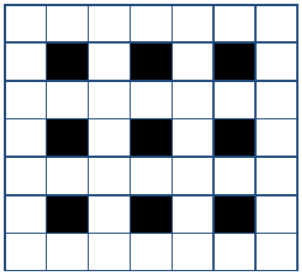


_____ [3]

16. Before going on holiday, Andrew finds that he and Brian have £40 holiday money between them and that he and Christopher have £37 between them. Christopher finds that he and Brian have £25 between them. How much do the boys have altogether?

_____ [3]

17. The table below shows a square board in which strips of white squares alternate with strips of black and white squares. A larger board is to be made in the same way. If it has 36 black squares, how many white squares will there be on this larger board?



_____ [3]

[Total: 75 marks]