SEVENOAKS SCHOOL

YEAR 9 (13+) ENTRANCE EXAMINATION

October 2012
for entry in September 2013

MATHEMATICS

Your Name: …….

Your School: …….

Time allowed: 1 hour

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

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 60 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.
6. Give your answers to three significant figures where appropriate.

Write all solutions in the space provided - you may continue onto A4 paper if required.
You must show all working, where appropriate, for each question. There are 60 marks available.

1. Match the probability of each of these events with one of the letters on the probability scale.

(a) Rolling an odd number on an ordinary dice ☐

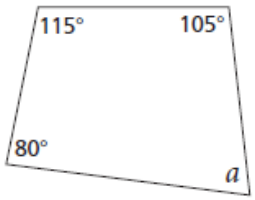
(b) Choosing a diamond from a pack of playing cards ☐

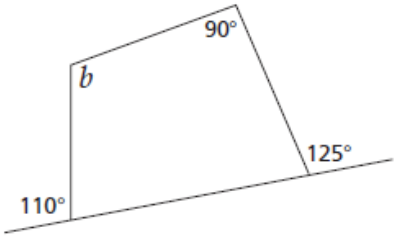
(c) **Not** rolling a 6 on a dice ☐

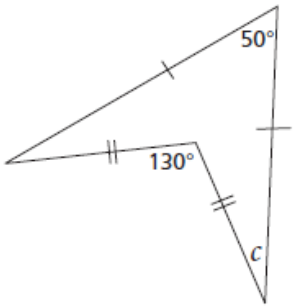


[3 marks]

2. Work out the sizes of the angles marked with letters.
The drawings are not accurate, so don't try to measure them.







a = ……. b = ……. c = ……. [4 marks]

3. The letters of the word P A R R O T are written on cards and placed in a hat.
A card is drawn at random. Work out the probability of taking out

(a) a letter P (b) a letter R (c) a vowel (A, E, I, O, U)

Ans …… Ans …… Ans …… [3 marks]

4. Solve these equations. Check your solutions.

(a) $2.4x + 7 = 43$

Ans …….

(b) $6(n - 3) = 102$

Ans ……...

(c) $\frac{t}{2.5} - 8 = 4$

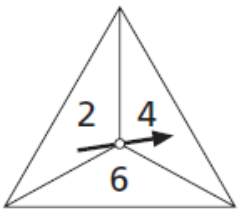
Ans …….

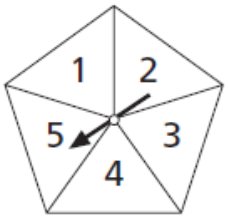
(d) $\frac{a + 1.5}{0.2} = 35$

Ans ……... [6 marks]

5. These two spinners are spun at the same time.

The resulting numbers are added together.





(a) List all the possible totals

(b) What is the probability of getting a total of 8 on the two spinners?

Ans ……

(c) What is the most likely total on the two spinners?

Ans ……

[4 marks]

6. A 24-hour digital clock shows the correct time at noon on January 1. If the clock loses 15 minutes per day, after how many days will the clock show the correct time?

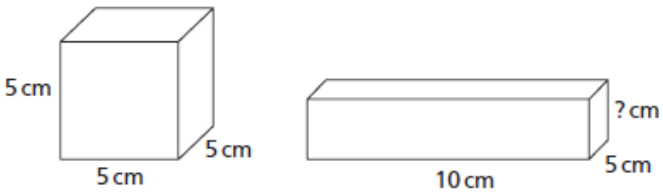
Ans …… [2 marks]

7. A box contains more than 25 but fewer than 40 tennis balls. When the balls are counted by threes there is one left over. When counted by fives there are two left over. How many balls in the box?

Ans …….. [2 marks]

8. This cube and cuboid have the same volume.

(a) Find the height of the cuboid.



(b) A different cuboid also has the same volume. Suggest possible dimensions for this cuboid.

(a) Ans ……..… (b) Ans ……...……

[3 marks]

9. The numbers 1 to 500 are arranged in order in a table

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Row 1	1	2	3	4	5	6	7
Row 2	8	9	10	11	12	13	14
Row 3	15	16	17	18	19	20	21
Row 4	22	23	24	25	26	27	28

Only rows 1, 2, 3 and 4 are shown but there are many more rows.

(a) What is the last number in row 8?

Ans ……

(b) What is the number in row 12 and column 3?

Ans ……

(c) What row and column will contain the number 400?

Ans …… [5 marks]

10. Increase the following amounts by the percentages shown.

(a) £78 by 10%

(b) £230 by 20%

Ans …….

Ans ……...

Decrease the following amounts by the percentages shown.

(c) £48 by 5%

(d) £420 by 15%

Ans …….

Ans ……...

[4 marks]

11. Evaluate the following:

(a) $3^3 \times 4^2$

(b) $(5 \times 10^3)^2$

Ans ……

Ans ……

(c) $2^5 \times 5^3$

(d) $\sqrt{(225)}$

Ans ……

Ans ……

[4 marks]

12. Simplify:

(a) $x^5 \times x^3$

Ans ……...

(b) $\dfrac{x^4 \times x^5}{x^3}$

Ans ……...

(c) $2a^5b^2 \times 3a^2b^2$

Ans ……...

(d) $36a^4b^3 \div 4a^2b$

Ans ……...

(e) $\dfrac{2a^2bc^3 \times 6a^3b^2c}{4ab^3c^2}$

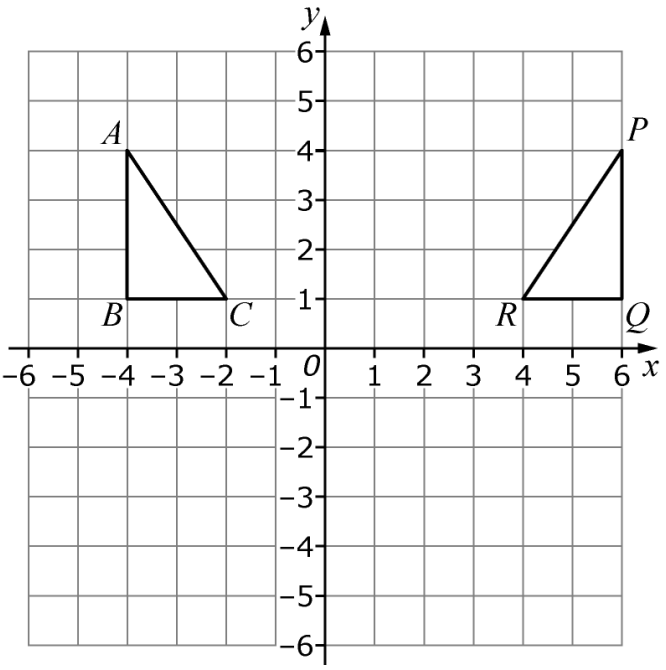
Ans ……...

[6 marks]

13. *ABC* and *PQR* are triangles.

(a) Describe the **single** transformation that takes *ABC* to *PQR*.

Ans ……...



(b) Triangle *ABC* is rotated 90° anticlockwise about (0, –1). Draw the transformed triangle.

[3 marks]

14. There are 3 islands close together near Australia: Azure, Bounty and Coconut. On the 3 islands live 3 types of guinea pig: Pongos, Quangos and Ringos. The following are all true facts well known to sailors in this part of the world:

1) There are no Pongos on Bounty island
2) All the guinea pigs on Coconut island are Ringos
3) Pongos and Quangos are the only type of guinea pig on Azure island

A shipwrecked sailor lands on one of the islands. He sees a guinea pig which he thinks is a Ringo.

(a) Which island does the sailor think he is definitely NOT on?

Ans ……...

Later he sees another guinea pig. He is not sure what it is, but it is certainly different from the first guinea pig.

(b) Which island is he definitely NOT on?

Ans ……...

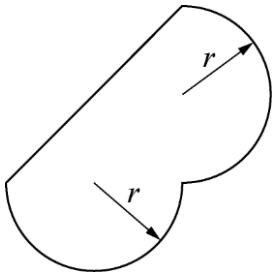
After looking closely, he identifies the second guinea pig, without doubt, a Pongo.

(c) Which type of guinea pig did he see first of all?

Ans ……...

[3 marks]

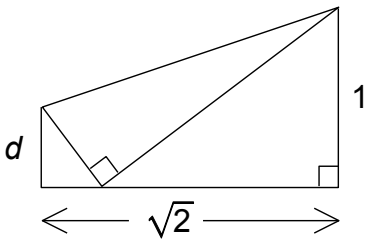
15. Jo drew the following shape. What is the formula for the area?



Ans ……...

[4 marks]

16. A rectangular sheet of paper with sides 1 and $\sqrt{2}$ has been folded once as shown, so that one corner just meets the opposite long edge. What is the value of the length d?



Ans ……...

[4 marks]