ROKEBY

SURNAME ....
FIRST NAME ....
FORM/SET ....
SENIOR SCHOOL ....

Year 8 Scholars

MATHEMATICS EXAMINATION

Spring 2011

PLEASE READ THE FOLLOWING INFORMATION

- The examination is 90 minutes long
- **ALL** questions should be attempted
- Answers should be written on the paper provided
- Show sufficient working and explanation to make your methods clear
- Answers should be simplified where possible
- **You may use a calculator on questions 5, 6 & 7**

1. Evaluate the following:

a) $(3/4 - 2/5)^2$

b) $\dfrac{2 \times 45 \times 101}{5 \times 3\ 101}$

c) $y^2 + 7y - 5 = y^2 + 9$

d) $3(2 - y) - 2(4 - 3y) = 0$

e) which fraction is halfway between 1/6 and 1/7?

[5]

2. Draw x and y axes with values of x from 0 to 11 and values of y from 0 to 6.

A is the point (2,1), B is (7, 1) and C is (5, 5).

(i) Plot A, B and C on your axes and join them up to form a triangle. [2]
(ii) Calculate the lengths AB, AC and BC [4]
(iii) What type of triangle is ABC? [1]
(iv) Calculate the area of triangle ABC [2]
(v) Calculate the perpendicular distance from A to the line BC [3]
A, B and C are three vertices of a rhombus ABCD.
(vi) State the coordinates of D, the fourth vertex. [1]

3. I can jog at x m/s

(i) How long does it take me to jog 60 m? [1]

If I jog 1 m/s faster ,

(ii) how long does it take me to 60 m? [2]
(iii) if it takes me four seconds less at the faster speed, show that

$$\dfrac{15}{x} - \dfrac{15}{x + 1} = 1$$

[2]

4. The first four terms of a sequence are: **4   13   28   49**
(i) Write down the difference between the terms and use them to predict the sixth term. [3]

Katherine calculates the terms using the formula for the nth term

$$t_n = 3n^2 + 1$$

(ii) Use two terms from the sequence to confirm that her calculations are correct. [2]
(iii) Use the formula to predict the 100th term of the sequence. [1]
(iv) Which term of the sequence is 676? [3]

5. Eric the greengrocer bought 60 punnets of gooseberries for £1 each. He sold one third of the punnets and made a profit of 60% on each one.

(i) For how much did he sell the punnets altogether? [2]

He sold the next 30 punnets, making a profit of 25% on each of them, and made a loss of 15% on the sale of each of the remaining punnets.

(ii) How much was his overall profit on the 60 punnets? [3]
(iii) What was his overall percentage profit? [2]

6. When Suzie hires a car from Limo, she pays £10 fixed charge and 50p per mile.

(i) What is the total cost of a 30 mile journey including the fixed charge? [1]
(ii) What is the total cost of a journey of x miles including the fixed charge? [3]

The same car hired from Bangers has no fixed charge and costs 75p per mile.

(iii) What is the cost of a journey of 30 miles? [1]
(iv) What is the cost of a journey of x miles? [1]
(v) Use your answers to parts (ii) and (iv) to find the number of miles Suzie needs to travel for the total costs to be identical under the two schemes. [3]
(vi) Draw axes with a horizontal scale for distances from 0 to 100 miles and a vertical scale for cost from 0 to £80. [1]
(vii) Draw the graphs which represent each company's hiring charges. [5]
(viii) After how many miles is one charge exactly £5 more than the other? [2]

7. Ornamental discs are made from metal circles of radius 1.5 cm, with a circular hole of radius 0.5 cm cut out. Any metal left over is then recycled so that none is wasted.
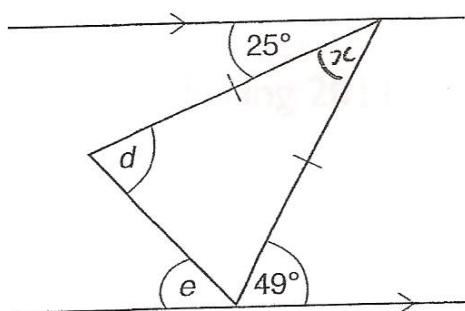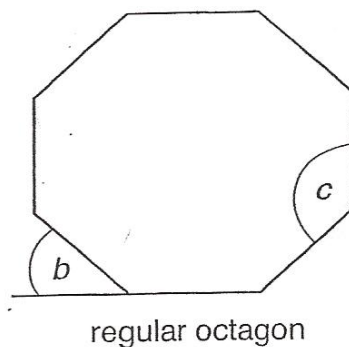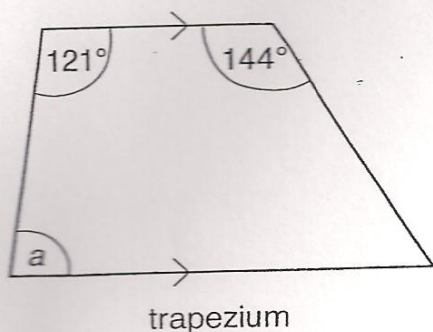

not to scale
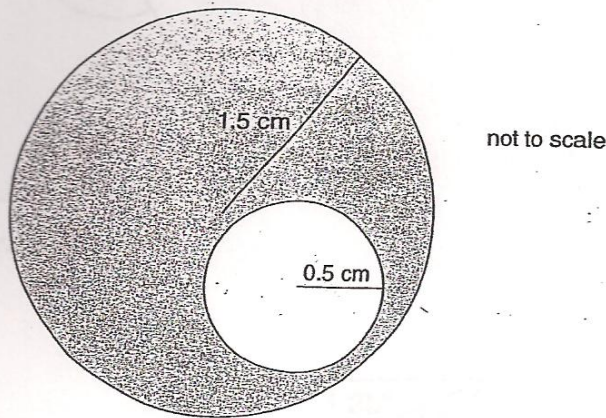
(i) Calculate the shaded area of the ornamental disc. [3]
(ii) If the thickness of the metal for each disc is 2 mm, calculate the volume of the metal used in each disc, giving your answer in cm³, correct to two decimal places. [3]
A cubic centimetre of metal costs £2.34
(iii) Calculate the cost of producing 1000 ornamental discs to the nearest £10. [3]
The discs are sold as lucky charms and the manufacturer wishes to make a profit of 40% on each disc sold to the retailer.
(iv) For how much should the manufacturer sell the 1000 discs? [3]
The retailer sells each disc for £6.99
(v) What is the retailer's percentage profit on each disc? [3]

8.
(i) Find the coordinates of the point A where the line $6x + 3y = 33$ intersects the x axis. [2]
(ii) Find the coordinates of the point B where the line $2x + 3y = 30$ intersects the y axis. [2]
(iii) Find the coordinates of the point C of intersection of the lines $6x + 3y = 33$ and $2x + 3y = 30$ [2]
(iv) If O is the point (0,0), find the area of the quadrilateral OACB. [4]

9. Find the sizes of the angles a, b, c, d, e and x marked on the following diagrams.

trapezium

regular octagon

not to scale

[9]

10.
(a) Dillum is practising for a game of darts.
After throwing d darts, Dillum's average score per dart was 14.
(i) Write an expression in d for his total score.

$14d$ threw d darts

[1]

Then he scored 50 by hitting the bull's eye. His average increased by 4.
(ii) Form an equation in d, and solve it to find the total number of darts that Dillum threw.

$\dfrac{14d + 50}{d + 1}$

[4]

(b) Mr Jenkins has only red or green ties. He has 20 red ties and 30 green ties.
(i) How many more red ties must he buy for 75% of his ties to be red? [3]

Mr Perkins' collection contains only p pink ties and w white ties.
(ii) Write an expression for the number of extra pink ties he must buy for 75% of his ties to be pink. [2]

If you have time, go back and check through your work carefully.