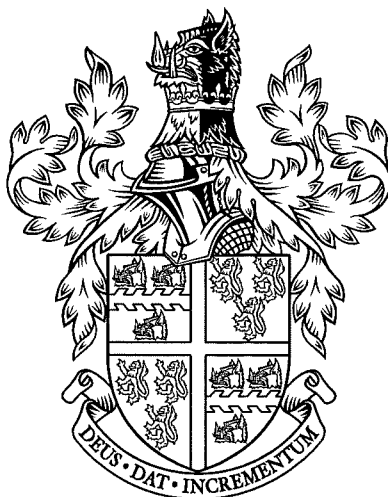


Name: School:



TONBRIDGE SCHOOL

Year 10 Entrance Examinations 2013

MATHEMATICS

Saturday 9 November 2013

Time allowed: 1 hour

Total Marks: 75

A CALCULATOR CAN BE USED IN THIS EXAM

Instructions:

1. Complete “Name” and “School” section at the top of cover page
2. All questions should be attempted and answers given in the space provided
3. No additional paper, including graph paper, is required.

1. Expand and simplify the following:

a) $5(5 + 3x)$

Answer: [2]

b) $(3x + 2)(x + 3)$

Answer: [3]

c) $(x - y)(5x + 2y)$

Answer: [3]

d) $(m - 4p)^2$

Answer: [3]

2. Solve the following equations:

a) $3(x - 3) = 18$

Answer: [2]

b) $2x + 4(x - 5) = 4$

Answer: [3]

c) $8 = \frac{72}{x}$

Answer: [2]

d) $\frac{2}{x-1} = 5$

Answer: [2]

e) $\frac{2x-1}{x} = \frac{3}{4}$

Answer: [3]

f) $\frac{2}{x-1} = \frac{3}{2x+4}$

Answer: [3]

g) $\frac{2x-1}{3} - \frac{x+1}{4} = 4$

Answer: [3]

h) $9x^2 = 16$

Answer: [3]

3. Triangle ABC has an angle equal to 90° at C , length of side AC equal to 5cm and length of side AB equal to 10cm.

a) Draw a diagram, with appropriate labels and showing all the above information. The diagram does **not** need to be drawn with accurate lengths.

[3]

b) Calculate the length of side BC , giving answer to 3 significant figures

Answer: [3]

c) Calculate the exact size of angle BAC .

Answer: [3]

4. A line, **L**, passes through the points $(3,0)$ and $(-1,1)$.

a) By first drawing a set of axes, illustrate the line, **L**, on a graph.

[3]

b) Calculate the gradient of **L**.

Answer: [2]

c) Determine the equation of **L**.

Answer: [4]

5. Solve the simultaneous equations

$$8x - 3y = 21$$

$$5x + y = 16$$

$$x = \dots\dots\dots, \quad y = \dots\dots\dots [4]$$

6. An insect colony decreases after the spread of a virus. Its population y after t months is given by the equation

$$y = \frac{2000}{t}$$

valid for $1 \leq t \leq 6$

- a) Complete the table

t (months)	1	2	3	4	5	6
y	2000					

[2]

- b) By first drawing a set of axes, then plotting appropriate points based on the information in the above table, draw a graph of y against t

[4]

- c) Calculate the size of population of the insect colony when it has decreased by 70% from its size after 1 month

Answer: [2]

- d) Using your graph, **estimate** when the population has decreased to the size calculated in part (c), giving your answer in the space below.

Answer: [1]

7. The graph $y = x^2 - 3x + 2$ is to be drawn. Determine the exact values of the x coordinates where the graph cuts the x -axis.

Answer: [4]

8. ABC is a triangle and D is a point on AB .

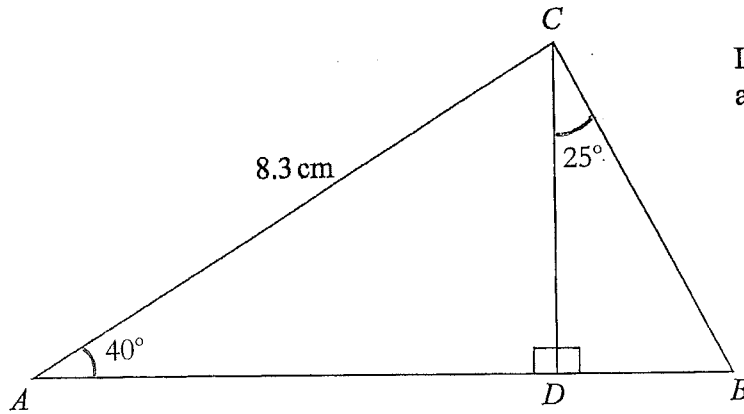


Diagram **NOT** accurately drawn

- a) Calculate the length of DC , giving your answer to 3 significant figures

Answer: [3]

- b) Calculate the length of BC , giving your answer to 3 significant figures

Answer: [5]

END OF EXAM

