Name: …… School: ……...

TONBRIDGE SCHOOL

Test for Entrance into Year 10: Specimen B

MATHEMATICS

Time allowed: 1 hour

Total Marks: 80

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 **fully** simplify the following:

a) $4(5-3x)$

Answer: …….. [2]

b) $(2x-1)\,(x+5)$

Answer: …….. [3]

c) $(x+y)\,(2x-3y)$

Answer: …….. [3]

2. Solve the following equations:

a) $4(x-3) = 20$

Answer: …….. [2]

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

Answer: …….. [3]

c) $12 = \frac{36}{x}$

Answer: …….. [2]

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

Answer: …….. [2]

e) $\frac{2x-1}{3} = \frac{x}{5}$

Answer: …….. [3]

f) $\frac{2}{x-1} = \frac{5}{x+4}$

Answer: …….. [3]

g) $\frac{2x-1}{3} - \frac{x+1}{5} = 2$

Answer: …….. [3]

h) $2x^2 = 512$

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 9cm.

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 your answer to 3 significant figures

Answer: …….. [2]

c) Calculate the size of angle ABC, giving your answer to 3 significant figures

Answer: …….. [3]

4. A line, **L**, passes through the points $(4,0)$ and $(-1,-2)$.

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. a) Solve the simultaneous equations

$$3u - 2v = 17$$
$$5u - 3v = 28$$

u = …… v = …… [4]

6. The following graph is to be drawn

$$y = 2x^2 - 3x$$

a) Complete the table

x	-2	-1	0	1	2	3
y		5				9

[3]

b) **By first drawing a set of axes**, then plotting appropriate points based on the information in the above table, draw the graph for the values $-2 \leq x \leq 3$

[3]

c) **<u>Using your graph</u>**, ***estimate*** the solutions of the equation

$$2x^2 - 3x = 1$$

Answers: …… and …….. [2]

7. **Fully** simply the following:

a) $2m + 3m$

Answer: ……. [1]

b) $3y^3$ x $3y^3$

Answer: ……. [2]

c) $\frac{9y^6}{3y^2}$

Answer: ……. [2]

d) $(4a^2b^6)^2$

Answer: ……. [3]

8. A car journey of 380 km takes 4 hours. Part of this journey is on a motorway at an average speed of 110 km per hour; the remainder of the journey is on country roads at an average speed of 70 km per hour.

a) Write this information as a pair of simultaneous equations

Answer: …….. [3]

b) Solve these simultaneous equations to find how many kilometres of the journey is spent on the motorway.

Answer: ……km [3]

9. a) A formula is given as $v = u + at$

Calculate the value of t when $v = 12, u = -3, a = 5$

Answer: …….. [2]

b) A formula is given as $h = \sqrt{a^2 + b^2}$

Calculate the values of a when $h = 13, b = 5$

Answer: …….. [3]

c) A formula is given by $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

Calculate the value of u when $f = 5, v = 6$

Answer: …….. [3]

END OF PAPER