**Name: …… School: ……...**

# TONBRIDGE SCHOOL

**Year 10 Entrance Examinations: Specimen A**

## MATHEMATICS

**Time allowed: 1 hour**

**Total Marks: 80**

**A CALCULATOR CAN BE USED IN THIS EXAM**

***Instructions:***

1. Complete Name and School at the top of cover page.

2. **All questions should be attempted** and answers given in the space provided.

3. A completely correct answer may receive no marks unless all workings are shown.

1. Expand and **fully** simplify the following:

a) $3(6-2x)$

Answer: …….. [2]

b) $(4x-1)\,(2x+5)$

Answer: …….. [3]

c) $(a+b)\,(3a-4b)$

Answer: …….. [3]

2. Solve the following equations:

a) $8(y - 3) = 20$

Answer: …….. [2]

b) $2x - 8(x - 3) = 1$

Answer: …….. [3]

c) $16 = \frac{36}{y}$

Answer: …….. [2]

d) $\frac{2}{x-2} = 7$

Answer: …….. [2]

e) $\frac{2x-1}{3} = \frac{x}{8}$

Answer: …….. [3]

f) $\frac{6}{x-1} = \frac{5}{x+4}$

Answer: …….. [3]

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

Answer: ……..…….. [3]

3. Triangle $ABC$ has an angle equal to $90°$ at $C$, length of side $AC$ equal to 6cm and an angle at A equal to $30°$

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 $AB$, giving answer to 3 significant figures.

Answer: …….. [2]

c) Use Pythagoras' Theorem to calculate the length of side $BC$, giving your answer to 3 significant figures.

Answer: …….. [3]

4. A line, **L**, passes through the points $(6,0)$ and $(-2,-4)$.

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: …….. [3]

5. The following graph is to be drawn:

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

a) Complete the table:

| $x$ | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | | 6 | | | | 10 |

[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:

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

Answers: …… and …….. [2]

6. **Fully** simply the following:

a) $3x^3$ x $3y^3$

Answer: ……. [2]

b) $\frac{18y^6}{6y^3}$

Answer: ……. [2]

c) $(8a^2b^6)^2$

Answer: ……. [2]

d) A formula is given as $v = 72\sqrt{T + 273}$.

Calculate the value of $T$ when $v = 1200$.

Answer: …….. [2]

7. (a) A man is 32 years older than his son. Ten years ago he was three times as old as his son was then. By forming an appropriate equation, or equations, find and list the age of each.

Answer: ……..…….. [3]

(b) A bus is travelling with 52 passengers. When it arrives at a stop, $x$ get off and 4 get on. At the next stop one third of the passengers get off and then 3 get on. There are now 25 passengers. Find $x$.

Answer: …….. [3]

8. (a) By first adding the three equations together, or otherwise, solve the equations:

$$3a + b + c = 5$$
$$a + 3b + c = -2$$
$$a + b + 3c = 7$$

Answer: …….. [3]

(b) Solve the equations:

$$3a + b + c + d = 4$$
$$a + 3b + c + d = -2$$
$$a + b + 3c + d = 10$$
$$a + b + c + 3d = 0$$

Answer: …….. [4]

9. Two sides of a regular pentagon, a square and a regular n sided polygon meet at the point P.

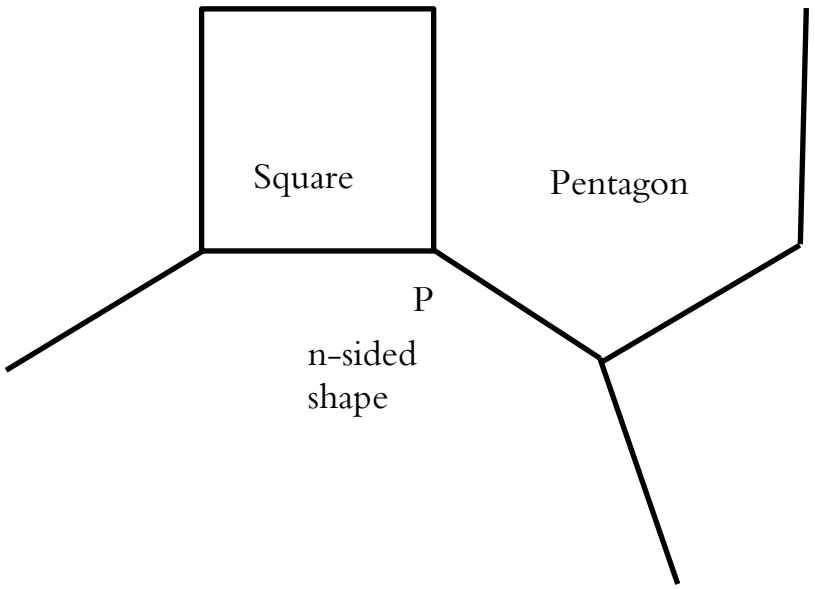



Diagram not accurately drawn

Find the value of n, showing your working clearly.

Answer: …….. [3]

10. A car completes a journey in 10 minutes. For the first half of the distance the speed was 60km/h and for the second half the speed was 40km/h. How far is the journey?

Answer: …….. [3]

11. Wallace and Gromit are waiting in a queue. There are $x$ people behind Wallace, who is $y$ places in front of Gromit. If there are $n$ people in front of Gromit, how long, in terms of $n$, $x$ and $y$, is the queue?

Answer: …….. [3]

# END OF EXAM