



# MATHEMATICAL TECHNIQUES

1<sup>ST</sup> JUNE 2013

## Examination Paper

**Answer ALL questions.**

**Clearly cross out surplus answers.**

**Time: 2 hours**

**Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.**

**GRAPH PAPER IS REQUIRED  
CALCULATORS ARE NOT PERMITTED  
SHOW ALL WORKINGS**

**CANDIDATES MUST ANSWER ALL QUESTIONS**

**QUESTION 1**

**Marks**

- a) Round 43.789437 to 1 decimal place. **1**
- b) Find the difference between 176.84 and 67.37. **2**
- c) i) Spencer buys 9 bags of toffees. Each bag costs £1.29. How much does he spend? **2**  
ii) Each bag contains 28 toffees. **1**  
Connor has 168 toffees. How many bags did he buy?
- d)  $0.00673 \times ? = 6.73$  **1**
- e) In a lecture theatre each row has 38 seats. There are 24 rows in the theatre. How many seats are there altogether? **3**
- f)  $46 \times 3.48 = 160.08$  **2**  
Use this calculation to find the value of  $4.6 \times 348$
- g) Find  $368 \div 16$  **3**
- h) A list of 4 numbers has a mean of 5.6. What number must be added to the list to give a new mean of 6? **3**
- i) During a month Fearn records the time it takes her to walk to the bus stop in the morning to the nearest minute. The data is shown in the table below:

Time	13	14	15	16	17
Frequency	1	7	6	4	2

- i) Find the modal time. **1**
- ii) Find the median time. **1**

**Total 20 Marks**

QUESTIONS CONTINUE ON NEXT PAGE

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**QUESTION 2****Marks**

- a) Write the next 2 terms in the following sequences:
- i) -25, -21, -17, 1
  - ii) 0.04, 0.8, 16, 320, 1
  - iii) 3.4, 3.1, 2.8, 2.5, 1
- b) Expand the brackets and simplify the following expression, factorising where appropriate: 4  
 $3q + 7(p - 3q) - 2(6q - p)$
- c) Factorise: 3  
 $35z^3y + 20zy^2 - 10zy$
- d) Solve the equation: 3  
 $10 - 5k = 11 - 3k$
- e) A formula is given as  $V = 4h + 3p^2$  4  
Find the value of V when  $h = -0.5$  and  $p = 4$
- f) A line has the equation  $y = mx + 8$
- i) Write down the coordinates of the point where the line intercepts the y-axis. 1
  - ii) The point (3, 5) lies on the line. 2  
Find the value of m.

**Total 20 Marks****QUESTION 3**

- a) i) Write  $\frac{4}{25}$  as a decimal. 1  
ii) Find the square of -9. 1  
iii) What is the square root of 64? 1  
iv) Write 0.62 as a fraction. 1  
v) Work out  $0.4^2$ . 1
- b) £301 is divided between Sophie and Jayne in the ratio 3:4. 3  
How much does Jayne receive?
- c) Simplify the ratio 35:80 1
- d) The cost of 12 identical t-shirts is £35.40. What is the cost of 50 of these t-shirts? 3
- e) A museum has increased its entry fees. The cost of an adult ticket has increased by 5%. It now costs £5.67. Calculate the cost of an adult ticket before the increase. 4
- f) Calculate  $\frac{5}{6} + \frac{3}{4}$  4

**Total 20 Marks**

QUESTIONS CONTINUE ON NEXT PAGE

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**QUESTION 4****Marks**

- a) A parallelogram has an area of  $150\text{cm}^2$ . If the perpendicular height of the parallelogram is 12cm, what is the length of the base? **2**
- b) Below are four different weights. Put them in order from biggest to the smallest. **3**
- 91g            0.0091kg            910 000mg            0.009tonne
- c) Triangle ABC is an isosceles triangle. **2**

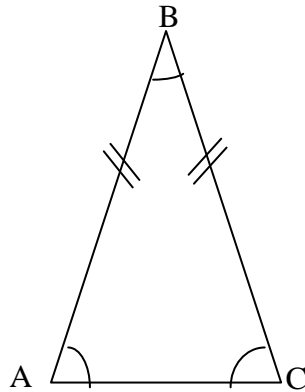


Diagram not to scale

If angle B is  $39^\circ$  what is the size of angle A?

- d) Find the size of one interior angle of a twelve-sided regular polygon. **3**
- e) A prism is 30cm long. Its cross-section is a right-angled triangle ABC, in which  $AB = 8\text{cm}$  and  $AC = 10\text{cm}$ . Calculate the volume of the prism. **7**

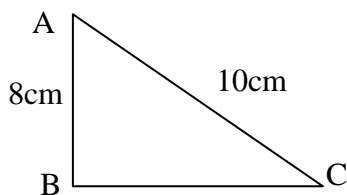


Diagram not to scale

- f) A four-sided dice (numbered 1-4) and a normal six-sided dice are thrown at the same time. A 'win' occurs when the number on the four-sided dice is greater or equal to the number on the normal dice. What is the probability of a 'win'? **3**

**Total 20 Marks**

QUESTIONS CONTINUE ON NEXT PAGE

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**QUESTION 5****Marks**

- a) The table shows the depth of tread of a sample of motorcycle tyres with the corresponding distance travelled on the tyre.

<b>Distance travelled (1000km)</b>	14	9	3	24	30	45	19	6	36
<b>Depth of tread (mm)</b>	8.8	9.6	10.4	8.2	7.9	6.7	7.9	9.2	7.6

- i) Use the values in the table above to draw a scatter graph of distance travelled against depth of tread. **5**
- ii) Mark on your graph the line of best fit and describe the relationship shown by the scatter graph. **2**
- b) A car dealership records the number of cars sold per week. Here are the results for 30 weeks.

8, 12, 7, 11, 13, 9, 11, 10, 15, 14, 30, 18, 21, 17, 16  
 19, 15, 19, 18, 12, 15, 12, 18, 24, 27, 18, 16, 30, 25, 28

- i) Construct an ordered stem and leaf diagram for the data. **4**
- ii) Find the median value. **2**
- iii) Complete the grouped frequency table below for the car dealership data. **1**

<b>Number of cars sold</b>	<b>Frequency</b>
0 – 9	
10 – 19	
20 – 29	
30 – 39	

- iv) Find the estimate of the mean number of cars sold in a week. **6**

**Total 20 Marks****END OF PAPER**