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# Mathematics

## May/June 2017

### Paper 3 (Calculator)

#### Foundation Tier

#### Time: 1 hour 30 minutes

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser

#### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– there may be more space than you need.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

#### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets  
– use this as a guide as to how much time to spend on each question.

#### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL TWENTY questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Write a number in each box so that each calculation is correct.

(i)  $65 \times \boxed{1000} = 65000$

(ii)  $4.56 \div \boxed{100} = 0.0456$

(2)

(b) Here is a list of numbers.

-5                      3                      -7                      4                      1

Write down the smallest number in the list.

-7

(1)

(c) Write down all the factors of 28

$$\begin{array}{l} 1 \times 28 \\ 2 \times 14 \\ 4 \times 7 \end{array}$$

1, 2, 4, 7, 14, 28

(2)

(d) Which two of the following numbers are prime numbers?

2      9      14      15      18      23      30

2 and 23

(2)

(Total for Question 1 is 7 marks)

2 A Youth Club is having a quiz night.

There will be 17 teams at the quiz night.

There will be 4 people in each team.

There will also be 3 people to organise the quiz.

Each person at the quiz will need a chair.

Work out the number of chairs needed.

$$17 \times 4 = 68$$

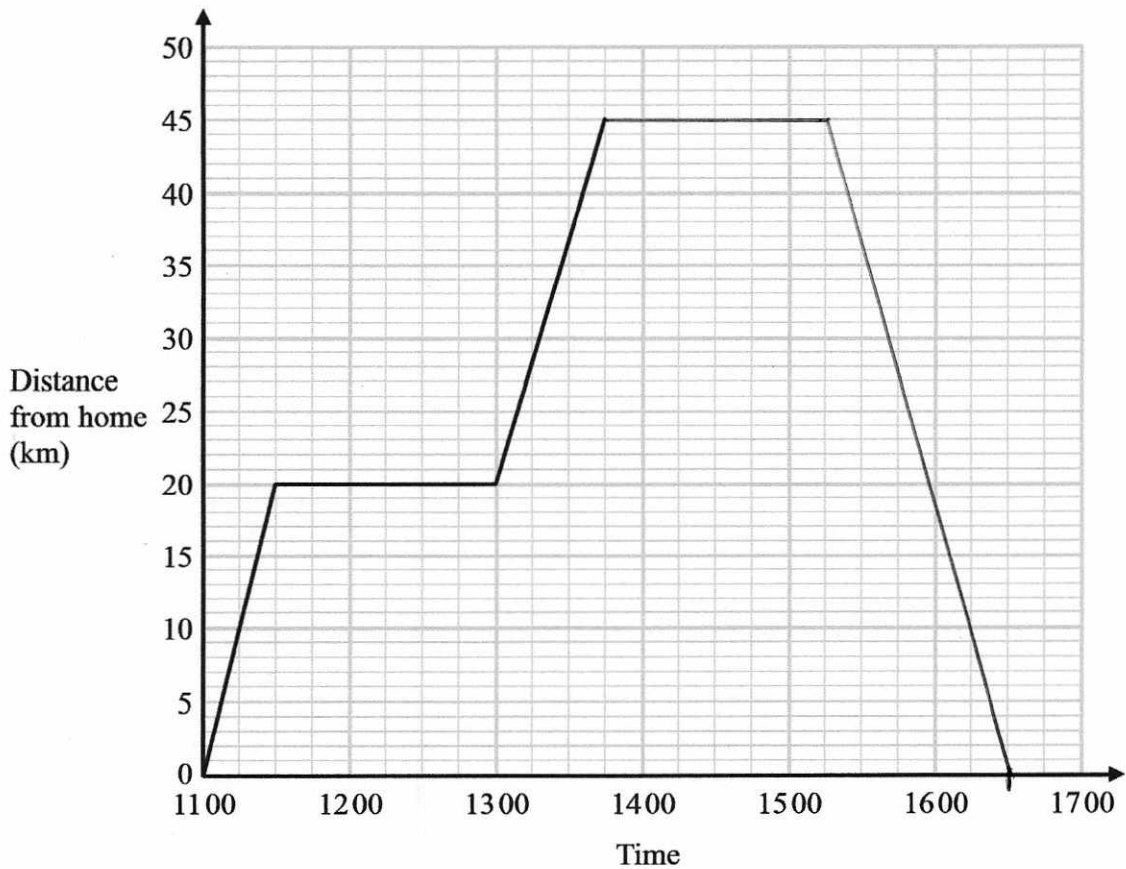
$$68 + 3 = 71$$

71

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(Total for Question 2 is 2 marks)

- 3 Lia left home at 1100 to drive to a shopping centre.  
On her way, she stopped at a friend's house.  
Here is the distance-time graph for her journey to the shopping centre.



- (a) (i) For how many minutes did Lia stay at her friend's house?

90 minutes

- (ii) How far is it from her friend's house to the shopping centre?

25 km  
(2)

Lia stayed at the shopping centre for  $1\frac{1}{2}$  hours.

She then drove back home.

She arrived home at 16 30

- (b) Show all this information on the distance-time graph.

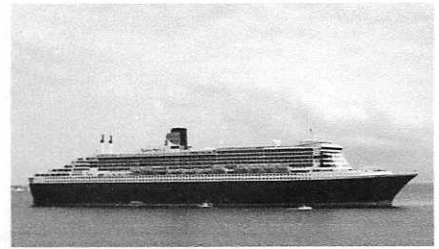
(2)

(Total for Question 3 is 4 marks)

- 4 The ocean liner Queen Mary 2 is the longest of its type.  
It has a length of 345 metres.

A scale model is made of the Queen Mary 2  
The scale of the model is 1 : 200

Work out the length of the scale model.  
Give your answer in centimetres.



$$34500 \text{ cm}$$

$$\frac{34500}{200} = 172.5 \text{ cm}$$

172.5 cm

(Total for Question 4 is 3 marks)

5 (a) The temperature in Moscow is  $-12^{\circ}\text{C}$ .

The temperature in Rome is  $15^{\circ}\text{C}$  higher than in Moscow.

Work out the temperature in Rome.

$$-12 + 15$$

$$\underline{3}^{\circ}\text{C}$$

(2)

(b) Work out

(i)  $7 - (-9)$

$$\underline{16}$$

(ii)  $-6 \times 5$

$$\underline{-30}$$

(2)

(c)

<b>Signs</b>			
+	-	×	÷

Write a sign in each box so that each of these statements are true.

(i)  $3 \boxed{+} 6 \times 4 = 27$

(ii)  $3 \boxed{\times} 6 + 28 \boxed{\div} 4 = 25$

(2)

(d) Work out the cube of 5

$$5 \times 5 \times 5$$

$$\underline{125}$$

(1)

(e) Find the square root of 256

$$\sqrt{256}$$

$$\underline{16}$$

(1)

(Total for Question 5 is 8 marks)



7

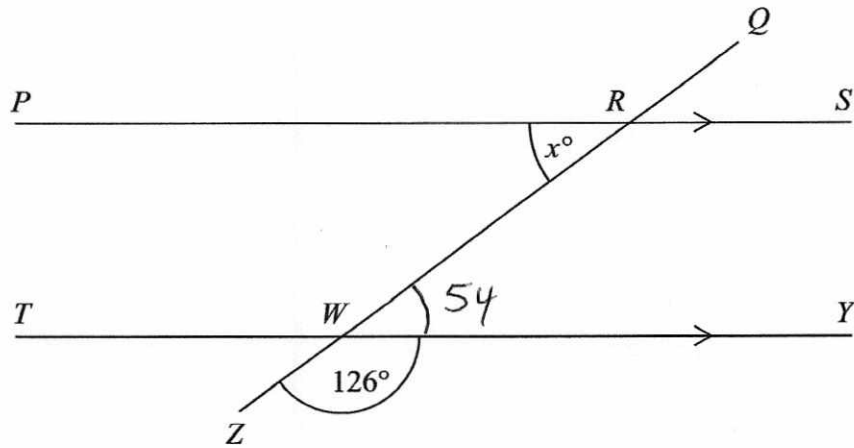


Diagram **NOT**  
accurately drawn

*PRS* and *TWY* are parallel straight lines.  
*QRWZ* is a straight line.

Work out the value of  $x$ .  
Give reasons for your answer.

$$180 - 126$$

$$RWY = 54^\circ$$

Angles on a straight line add  
to  $180^\circ$

$$x = 54^\circ \quad \text{Alternate angles are equal.}$$

(Total for Question 7 is 3 marks)



8

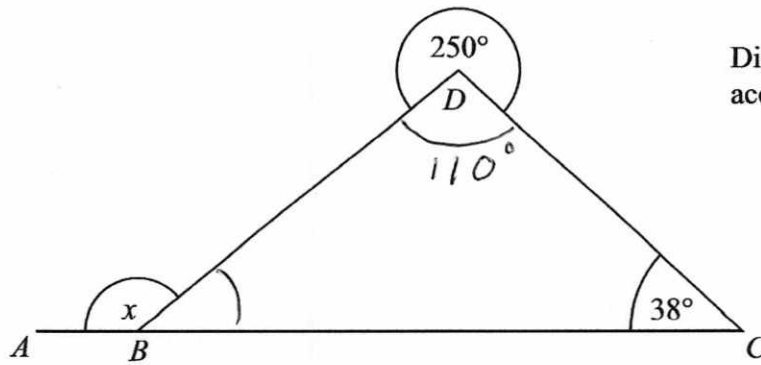


Diagram NOT  
accurately drawn

$ABC$  is a straight line.

Angle  $BCD = 38^\circ$

The reflex angle  $BDC = 250^\circ$

Work out the size of the angle marked  $x$ .

Give reasons for your answer.

$$BDC = 110^\circ \quad \text{Angles around a point add to } 360^\circ$$

$$DBC = 180 - 110 - 38 = 32^\circ$$

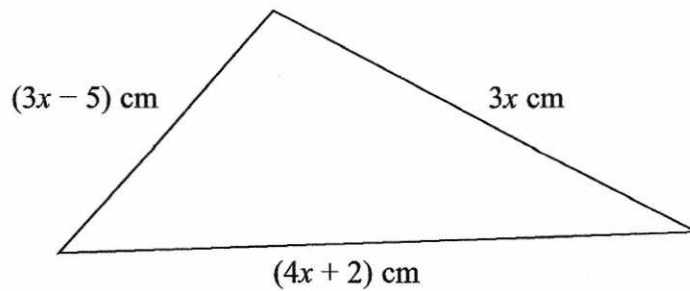
Angles in a triangle add to  $180^\circ$

$$x = 180 - 32 = \underline{\underline{148^\circ}}$$

Angles on a straight line add to  $180^\circ$

(Total for Question 8 is 4 marks)

9 The diagram shows a triangle.



The lengths of the sides of the triangle are  $3x$  cm,  $(3x - 5)$  cm and  $(4x + 2)$  cm.

The perimeter of the triangle is 62 cm.

Work out the value of  $x$ .

Show clear algebraic working.

$$\begin{aligned} 3x - 5 + 4x + 2 + 3x &= 62 \\ 10x - 3 &= 62 \\ +3 & \\ 10x &= 65 \\ \div 10 & \\ x &= 6.5 \end{aligned}$$

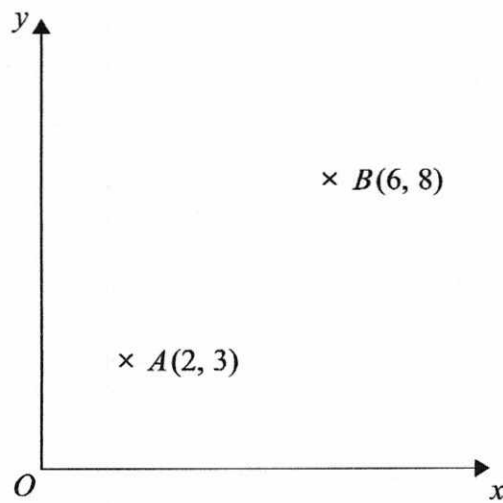
$$x = \underline{6.5}$$

(Total for Question 9 is 4 marks)

- 10 The point  $A$  has coordinates  $(2, 3)$ .  
The point  $B$  has coordinates  $(6, 8)$ .

$M$  is the midpoint of the line  $AB$ .

Find the coordinates of  $M$ .



$$\left( \frac{2+6}{2}, \frac{3+8}{2} \right)$$

$$(4, 5.5)$$

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(Total for Question 10 is 2 marks)

1 1 Here are the ingredients needed to make 10 pancakes.

Pancakes	
Ingredients to make 10 pancakes	
300 ml	of milk
120 g	of flour
2	eggs

Matthew makes 30 pancakes.

(a) Work out how much flour he uses.

$$\frac{30}{10} = 3$$

$$120 \times 3$$

$$\begin{array}{r} 360 \\ \hline \end{array} \text{ g}$$

(2)

Tara makes some pancakes.  
She uses 750 ml of milk.

(b) Work out how many pancakes she makes.

$$\frac{750}{300} = 2.5$$

$$2.5 \times 10$$

$$\begin{array}{r} 25 \\ \hline \end{array}$$

(2)

(Total for Question 1 1 is 4 marks)

12 On 1st May 2012, the cost of 5.7 grams of gold was 15 960 rupees.

(a) Work out the cost, in rupees, of 4.6 grams of gold on the same day.

$$\begin{array}{r} 5.7 \text{ g} = 15960 \text{ rupees} \\ \div 5.7 \qquad \qquad \qquad \div 5.7 \end{array}$$

$$\begin{array}{r} 1 \text{ g} = 2800 \text{ rupees} \\ \times 4.6 \qquad \qquad \qquad \times 4.6 \end{array}$$

$$4.6 \text{ g} = 12880$$

12880 rupees  
(2)

The cost of gold decreased by 7.5% from 1st May 2012 to 1st May 2013

(b) Work out the cost, in rupees, of 5.7 grams of gold on 1st May 2013

$$15960$$

$$7.5\% \times 15960 = 1197 \text{ rupees}$$

$$15960 - 1197$$

14763 rupees  
(3)

(Total for Question 12 is 5 marks)

13  $-5 < y \leq 0$

$y$  is an integer.

(a) Write down all the possible values of  $y$ .

$$\underline{-4, -3, -2, -1, 0}$$

(2)

(b) Solve  $6(x-2) > 15$

$$\begin{array}{r} 6x - 12 > 15 \\ +12 \quad \quad +12 \end{array}$$

$$6x > 27$$

$$x > \frac{27}{6}$$

$$x > 4.5$$

$$\underline{x > 4.5}$$

(2)

(Total for Question 13 is 4 marks)

P S E

14 Pritam, Sarah and Emily share some money in the ratios 3 : 6 : 4

Sarah gets \$15 more than Emily.

Work out the amount of money that Pritam gets.



$$2 \text{ parts} = \$15$$

$$1 \text{ part} = \$7.50$$

$$3 \times 7.50$$

\$ 22.50

(Total for Question 14 is 2 marks)

15 There are 130 adults at a language school.  
Each adult studies one of French or Spanish or German.

- 96 of the adults are women.
- 12 of the women study French.
- 73 of the adults study Spanish.
- 55 of the women study Spanish.
- 9 of the men study German.

How many of the adults study French?

	FRENCH	SPANISH	GERMAN	TOTAL
MEN	7	18	9	34
WOMEN	12	55	29	96
TOTAL	19	73	38	130

19

(Total for Question 15 is 3 marks)



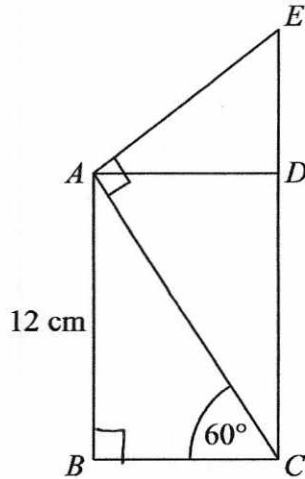
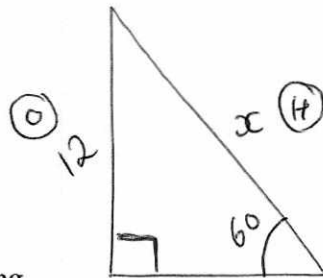


Diagram NOT accurately drawn

*ABCD* is a rectangle.  
*CDE* is a straight line.

*AB* = 12 cm  
 Angle *ACB* =  $60^\circ$   
 Angle *EAC* =  $90^\circ$

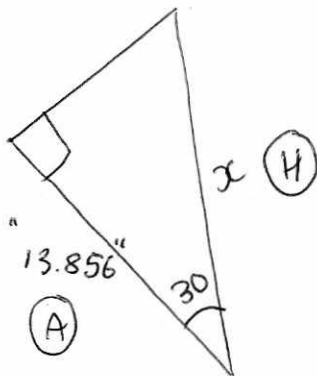
Calculate the length of *CE*.  
 You must show all your working.



$$\sin(60) = \frac{12}{x}$$

$$x = \frac{12}{\sin(60)}$$

$$= 13.85640646$$



$$\cos(30) = \frac{13.856}{x}$$

$$x = \frac{13.856}{\cos(30)}$$

$$= 16$$

..... 16 ..... cm

(Total for Question 16 is 4 marks)

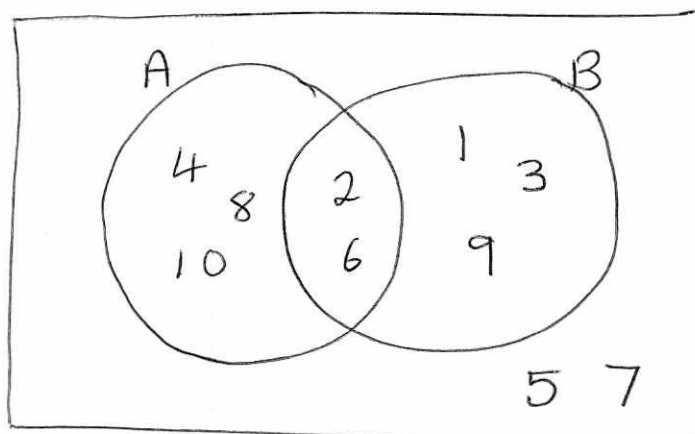
17  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{\text{multiples of 2}\}$

$A \cap B = \{2, 6\}$

$A \cup B = \{1, 2, 3, 4, 6, 8, 9, 10\}$

Draw a Venn diagram for this information.



(Total for Question 17 is 4 marks)

18 John changes £450 to euros.

The exchange rate is £1 = 1.16 euros.

(a) Change £450 to euros.

$$450 \times 1.16$$

..... 522 euros  
(2)

When in Amsterdam, John uses his credit card to pay for a ring costing 850 euros.

He has to pay a bank charge of £3.50 for using his credit card in addition to the cost of the ring.

(b) Work out the total cost, in pounds (£), of the ring and the bank charge.

$$850 \div 1.16 = \pounds 732.76$$

$$732.76 + 3.50 = \pounds 736.26$$

£ ..... 736.26  
(3)

(Total for Question 18 is 5 marks)

19 Solve the simultaneous equations

$$\begin{array}{r} 5y - 4x = 8 \quad \times 1 \\ y + x = 7 \quad \times 5 \end{array}$$

Show clear algebraic working.

$$\textcircled{1} \quad 5y - 4x = 8$$

$$\textcircled{2} \quad 5y + 5x = 35$$

$$\textcircled{2} - \textcircled{1} \quad 9x = 27$$

$$x = 3$$

$$\begin{array}{l} y = \\ y + 3 = 7 \\ y = 4 \end{array}$$

$$\begin{array}{l} x = \underline{\quad 3 \quad} \\ y = \underline{\quad 4 \quad} \end{array}$$

(Total for Question 19 is 3 marks)

20 In a box of pens, there are

three times as many red pens as green pens  
and two times as many green pens as blue pens.

$$\begin{array}{l} R \quad G \\ 3 : 1 \\ G \quad B \\ 2 : 1 \end{array}$$

For the pens in the box, write down  
the ratio of the number of red pens to the number of green pens to the number of blue pens.

$$\begin{array}{l} \times 2 \quad \begin{array}{c} R \quad G \quad G \quad B \\ 3 : 1 \quad 2 : 1 \\ 6 : 2 \quad 2 : 1 \end{array} \end{array}$$

$$6 : 2 : 1$$

$$6 : 2 : 1$$

(Total for Question 20 is 2 marks)