

Write your name here

Surname

Other names

**Pearson**  
**Edexcel GCSE**

Centre Number

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Candidate Number

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# Mathematics A

## Paper 1 (Non-Calculator)

**Higher Tier**

Wednesday 4 November 2015 – Morning  
**Time: 1 hour 45 minutes**

Paper Reference  
**1MA0/1H**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



### 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.*
- **Calculators must not be used.**

### Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed.

### 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.

Turn over ►

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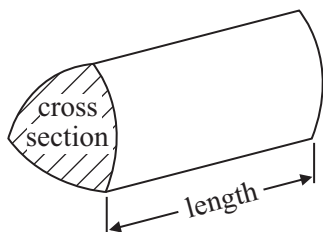
**PEARSON**

## GCSE Mathematics 1MA0

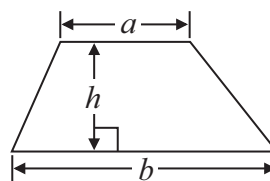
Formulae: Higher Tier

**You must not write on this formulae page.  
Anything you write on this formulae page will gain NO credit.**

**Volume of prism** = area of cross section  $\times$  length

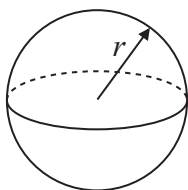


**Area of trapezium** =  $\frac{1}{2} (a + b)h$



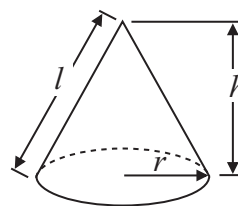
**Volume of sphere** =  $\frac{4}{3} \pi r^3$

**Surface area of sphere** =  $4\pi r^2$

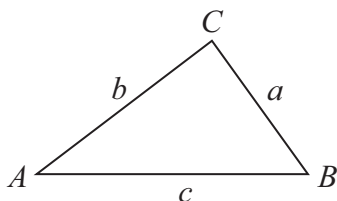


**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$   
where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2} ab \sin C$



**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

**1** Sean wants to go on holiday.

He is going to get a loan of £720 to help pay for the holiday.

Sean will have to pay back the £720 plus interest of 15%.

He will pay this back in 12 equal monthly installments.

How much money will Sean pay back each month?

£ .....

**(Total for Question 1 is 4 marks)**

---



2 Use the fact that

$$5.4 \times 36 = 194.4$$

to find the value of

(i)  $5.4 \times 3.6$

.....

(ii)  $54 \times 360$

.....

**(Total for Question 2 is 2 marks)**

---

3 Here are the first four terms of an arithmetic sequence.

11      17      23      29

(a) Find, in terms of  $n$ , an expression for the  $n$ th term of this arithmetic sequence.

.....

(2)

(b) Is 121 a term of this arithmetic sequence?

You must explain your answer.

.....

.....

.....

(2)

**(Total for Question 3 is 4 marks)**

---



- 4 There are some black pens, some blue pens, some red pens and some green pens in a box.

The table shows the probabilities that a pen taken at random from the box will be black or will be blue or will be red.

<b>colour</b>	black	blue	red	green
<b>probability</b>	0.3	0.2	0.4	

There are 200 pens in the box.

- (a) Work out the number of black pens in the box.

.....  
(2)

A pen is taken at random from the box.

- (b) Work out the probability that the pen will be green.

.....  
(2)

**(Total for Question 4 is 4 marks)**

---



5 Here are the ingredients needed to make 8 shortbread biscuits.

Shortbread biscuits makes 8 biscuits  120 g butter 60 g caster sugar 180 g flour
---

Tariq is going to make some shortbread biscuits.  
He has the following ingredients

330 g butter

200 g caster sugar

450 g flour

Work out the greatest number of shortbread biscuits that Tariq can make with his ingredients.

You must show all your working.

..... biscuits

**(Total for Question 5 is 3 marks)**



\*6

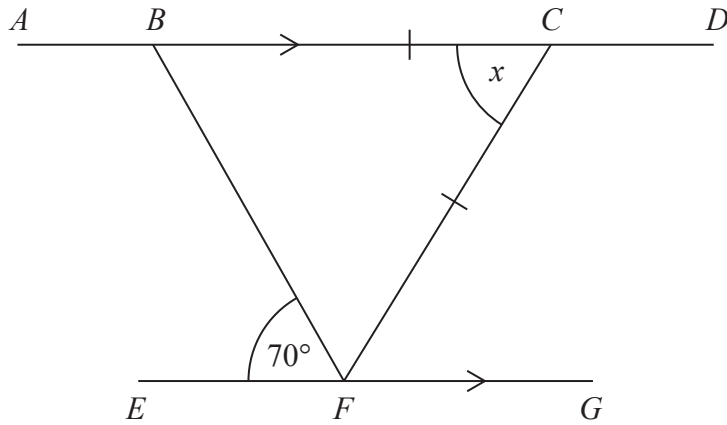


Diagram **NOT**  
accurately drawn

$ABCD$  and  $EFG$  are parallel lines.

$BC = CF$

Angle  $BFE = 70^\circ$

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

Give reasons for each stage of your working.

(Total for Question 6 is 4 marks)



- 7 Martin wants to find out how often students use the local tram service. He uses this question on a questionnaire.

How often do you use the local tram service?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a little	sometimes	a lot

- (a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

- (b) Design a better question for a questionnaire for Martin to find out how often students use the local tram service.

(2)

**(Total for Question 7 is 4 marks)**





- 8 Milk is sold in  $\frac{1}{2}$  pint bottles, in 1 pint bottles and in 2 pint bottles.

One weekend a shop sold 100 bottles of milk.

46 of the bottles were sold on Sunday.

15 of the bottles sold on Sunday were 2 pint bottles.

31 of the bottles sold on Saturday were  $\frac{1}{2}$  pint bottles.

22 of the bottles sold were 2 pint bottles.

30 of the bottles sold were 1 pint bottles.

How many 1 pint bottles were sold on Sunday?

.....  
(Total for Question 8 is 4 marks)



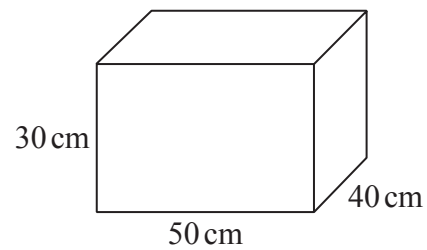
\*9 The diagram shows a container for oil.  
The container is in the shape of a cuboid.  
The container is empty.

Diagram **NOT**  
accurately drawn

Sally has to fill the container with oil.  
A bottle of oil costs £3.50  
There are  $3000\text{ cm}^3$  of oil in each bottle.

Sally must **not** spend more than £60 buying the oil.

Can Sally buy enough oil to fill the container?  
You must show all your working.



(Total for Question 9 is 4 marks)



10 (a) Expand  $x(x + 2)$

.....  
(1)

(b) Expand and simplify  $3(y + 2) + 4(x - 1)$

.....  
(2)

(c) Expand and simplify  $(2t - 3)(t + 5)$

.....  
(2)

(d) Factorise fully  $8a^2 + 12a$

.....  
(2)

(e) Factorise  $y^2 - y - 2$

.....  
(2)

---

**(Total for Question 10 is 9 marks)**



**11** Manchester airport is on a bearing of  $330^\circ$  from a London airport.

(a) Find the bearing of the London airport from Manchester airport.

.....  
(2)

The London airport is 200 miles from Manchester airport.

A plane leaves Manchester airport at 10 am to fly to the London airport.  
The plane flies at an average speed of 120 mph.

(b) What time does the plane arrive at the London airport?

.....  
(4)

**(Total for Question 11 is 6 marks)**

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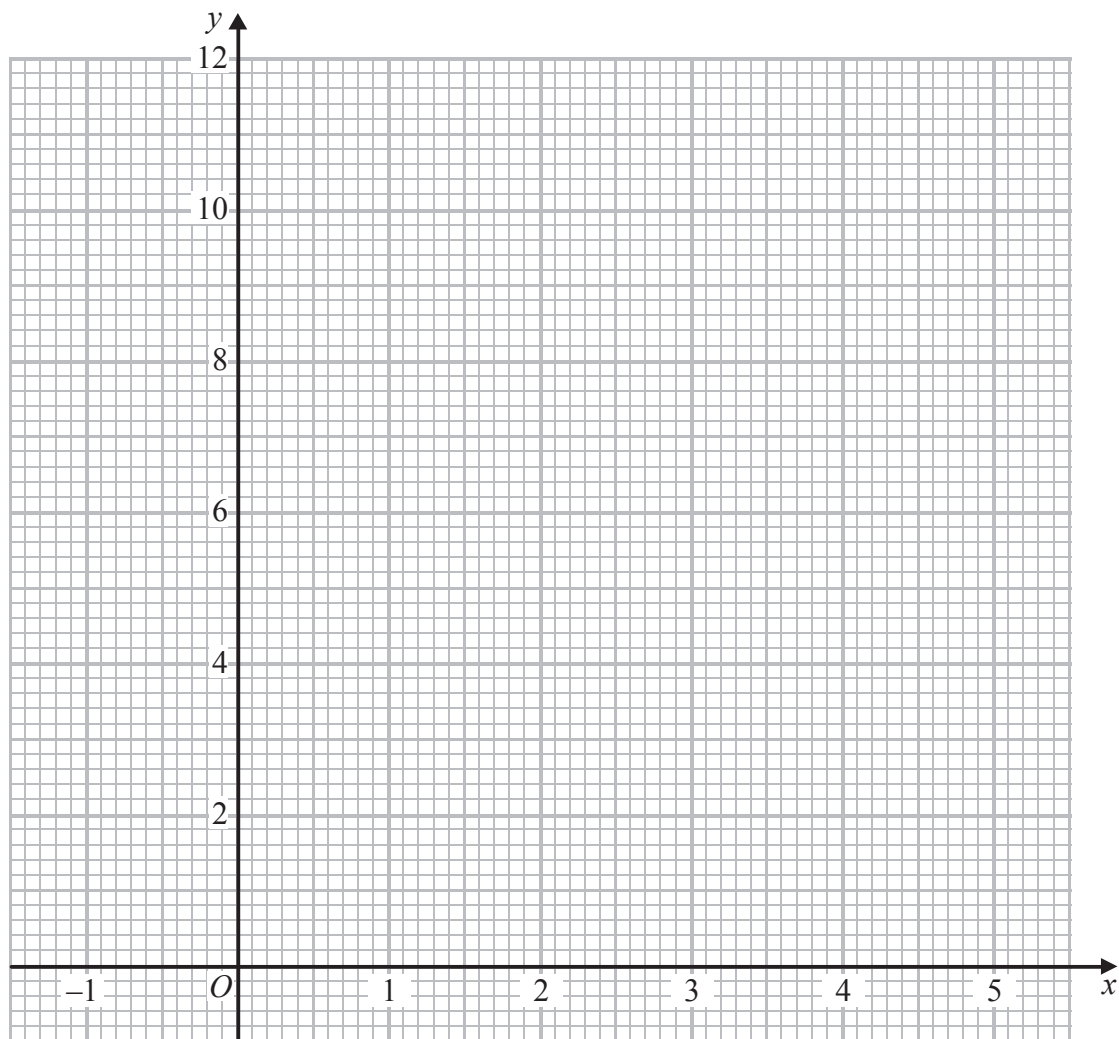
12 (a) Complete the table of values for  $y = x^2 - 3x + 2$

$x$	-1	0	1	2	3	4	5
$y$	6				2		12

(2)

(b) On the grid, draw the graph of  $y = x^2 - 3x + 2$  for values of  $x$  from -1 to 5

(2)



(c) Find estimates for the solutions of the equation  $x^2 - 3x + 2 = 4$

(2)

(Total for Question 12 is 6 marks)



**13** There are 18 packets of sweets and 12 boxes of sweets in a carton.

The mean number of sweets in all the 30 packets and boxes is 14

The mean number of sweets in the 18 packets is 10

Work out the mean number of sweets in the boxes.

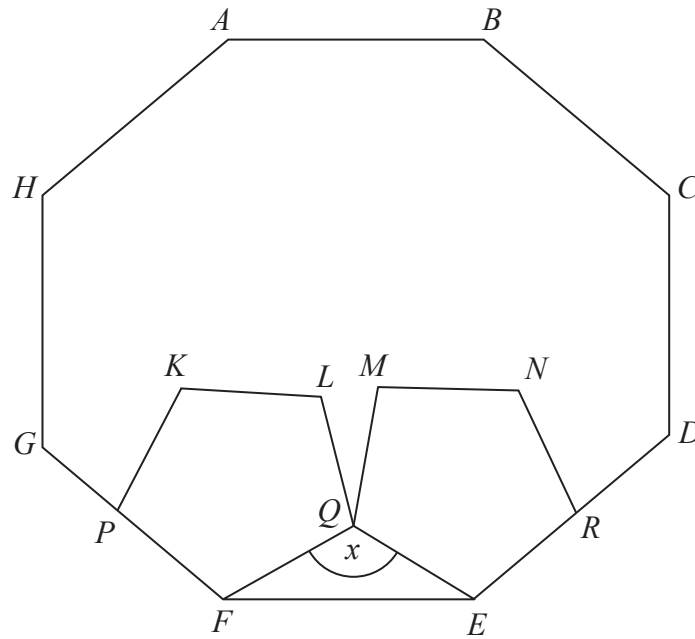
.....  
**(Total for Question 13 is 3 marks)**

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14

Diagram **NOT**  
accurately drawn



$ABCDEFGH$  is a regular octagon.  
 $KLQFP$  and  $MNREQ$  are two identical regular pentagons.

Work out the size of the angle marked  $x$ .  
You must show all your working.

(Total for Question 14 is 4 marks)



15 Sue works for a company that delivers parcels.

One day the company delivered 80 parcels.

The table shows information about the weights, in kg, of these parcels.

Weight ( $w$ kg)	Frequency
$0 < w \leq 1$	19
$1 < w \leq 2$	17
$2 < w \leq 3$	15
$3 < w \leq 4$	12
$4 < w \leq 5$	10
$5 < w \leq 6$	7

(a) Complete the cumulative frequency table.

Weight ( $w$ kg)	Cumulative frequency
$0 < w \leq 1$	
$0 < w \leq 2$	
$0 < w \leq 3$	
$0 < w \leq 4$	
$0 < w \leq 5$	
$0 < w \leq 6$	

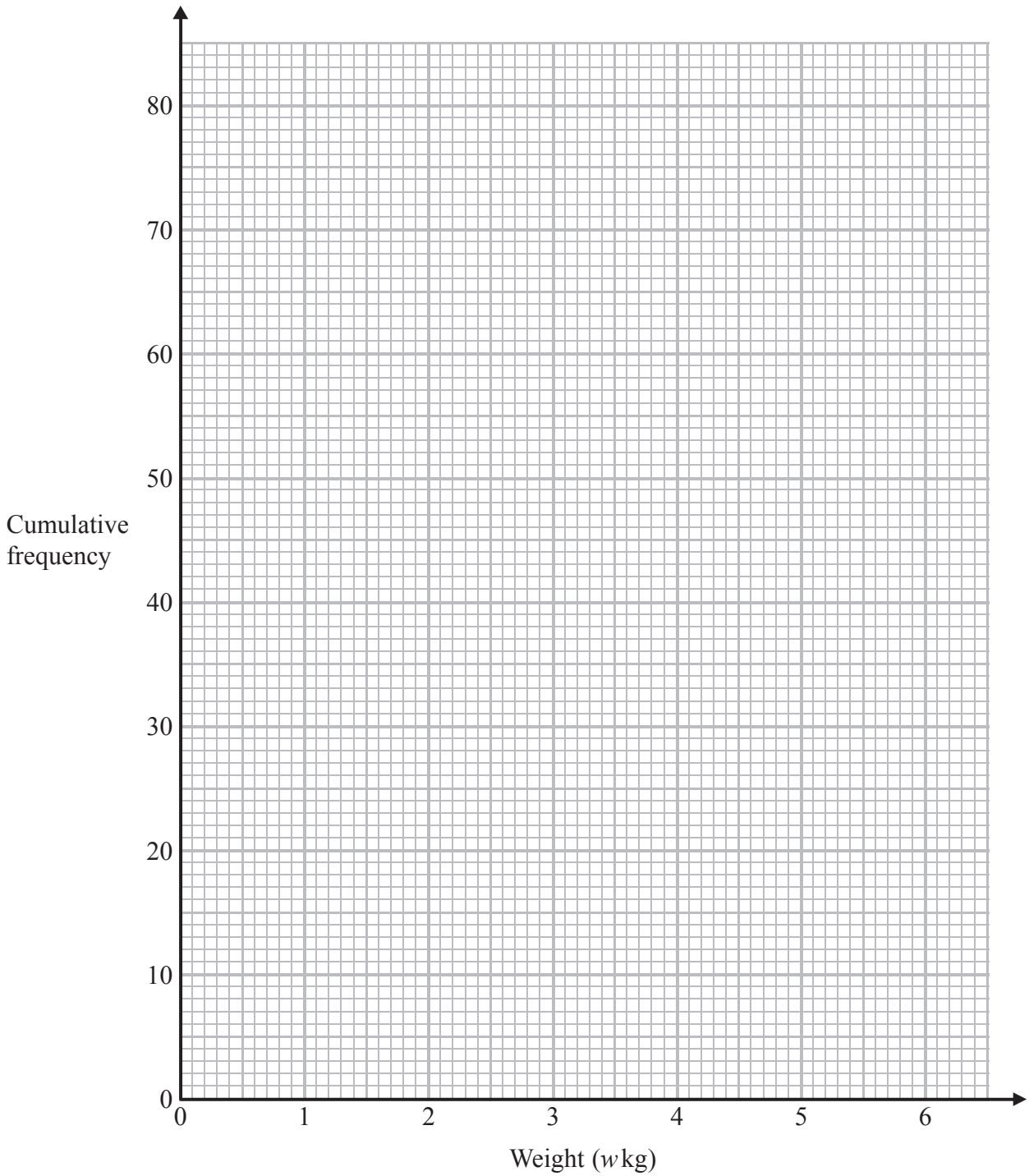
(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)







Sue says,  
 “75% of the parcels weigh less than 3.4 kg.”

\*(c) Is Sue correct?  
 You must show how you get your answer.

(3)

(Total for Question 15 is 6 marks)



- 16  $ABCD$  is a trapezium.  
 $STUV$  is a rectangle.

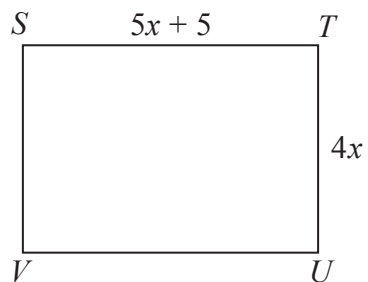
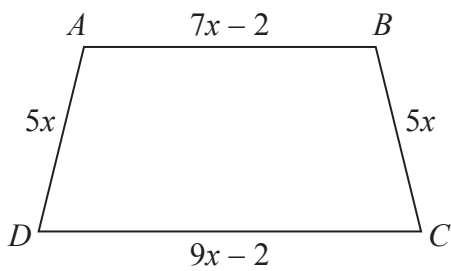


Diagram **NOT**  
accurately drawn

All measurements are in centimetres.

The two shapes have the same perimeter.

Work out the length of  $ST$ .

..... cm

**(Total for Question 16 is 5 marks)**



17 Solve

$$2x + 3y = \frac{2}{3}$$

$$3x - 4y = 18$$

$x =$  .....

$y =$  .....

**(Total for Question 17 is 4 marks)**

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18 Rationalise the denominator of  $\frac{10}{\sqrt{5}}$

Give your answer in its simplest form.

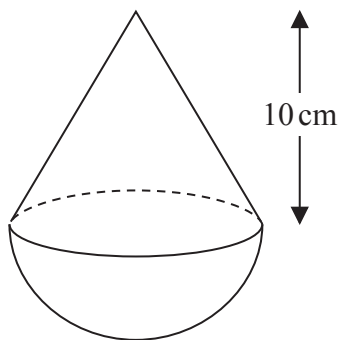
.....  
**(Total for Question 18 is 2 marks)**

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19 The diagram shows a solid shape.

Diagram **NOT**  
accurately drawn



The solid shape is made from a hemisphere and a cone.  
The radius of the hemisphere is equal to the radius of the base of the cone.

The cone has a height of 10 cm.  
The volume of the cone is  $270\pi\text{ cm}^3$ .

Work out the total volume of the solid shape.  
Give your answer in terms of  $\pi$ .

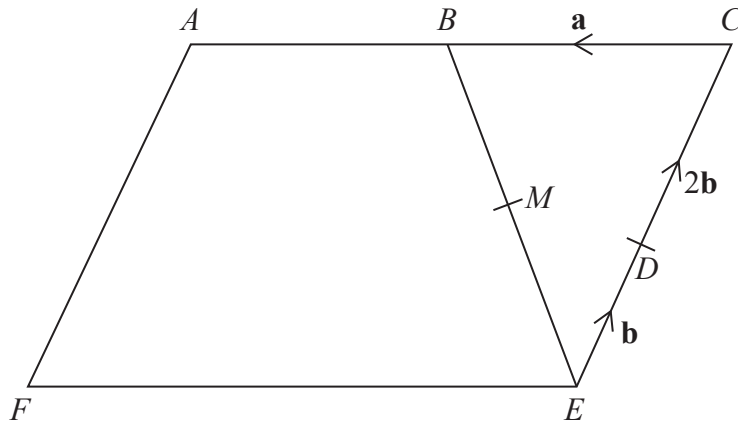
.....  $\text{cm}^3$

(Total for Question 19 is 5 marks)



\*20

Diagram NOT  
accurately drawn



$ACEF$  is a parallelogram.  
 $B$  is the midpoint of  $AC$ .  
 $M$  is the midpoint of  $BE$ .

$$\vec{CB} = \mathbf{a}$$

$$\vec{ED} = \mathbf{b}$$

$$\vec{DC} = 2\mathbf{b}$$

Show that  $AMD$  is a straight line.

(Total for Question 20 is 5 marks)



P 4 5 8 2 8 A 0 2 1 2 4

21 (a) Write as a single fraction in its simplest form  $\frac{5}{2-x} - \frac{4}{x}$

.....  
(3)

(b) Make  $y$  the subject of the formula

$$t = \frac{2-3y}{y+2}$$

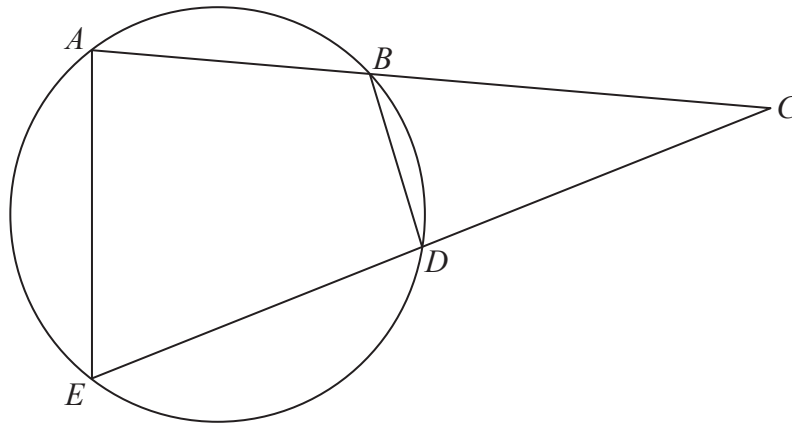
.....  
(4)

(Total for Question 21 is 7 marks)



\*22

Diagram **NOT**  
accurately drawn



$A$ ,  $B$ ,  $D$  and  $E$  are points on a circle.  
 $ABC$  and  $EDC$  are straight lines.

Prove that triangle  $BCD$  is similar to triangle  $ECA$ .  
You must give reasons for your working.

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(Total for Question 22 is 5 marks)

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TOTAL FOR PAPER IS 100 MARKS



P 4 5 8 2 8 A 0 2 3 2 4

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