

Name.....

Teacher.....

## 5<sup>th</sup> Year October Assessment

**Alpha sets**

**1 hour**

**(63 marks)**

Give all answers to 3sf where necessary.

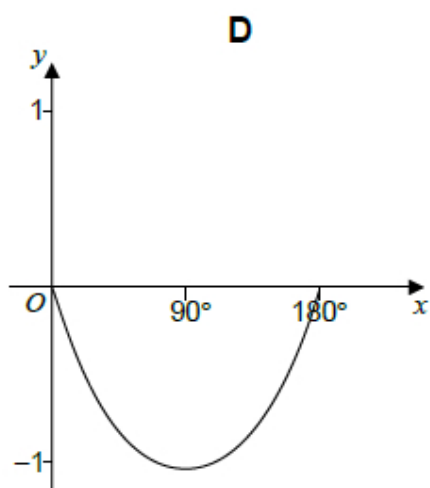
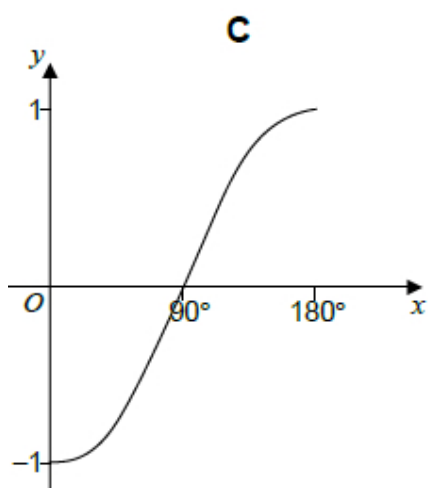
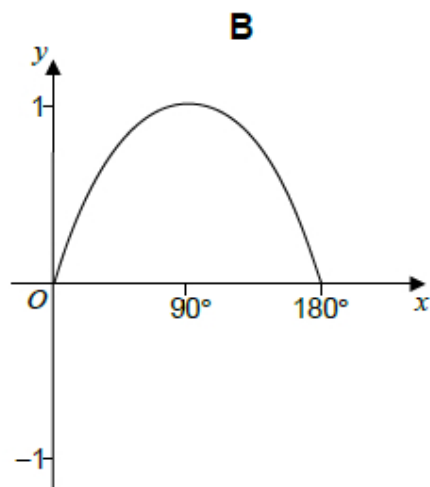
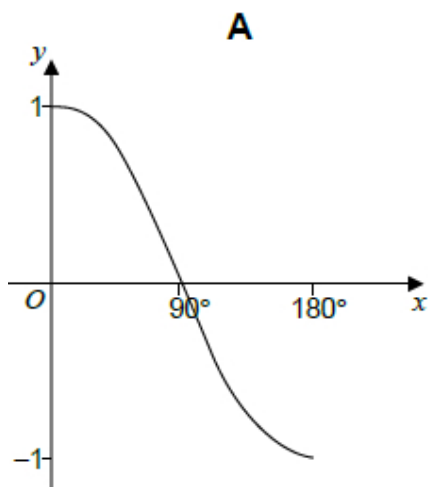
Show your full working.

Calculators Allowed

- 1) One of these is a sketch of  $y = \cos x$  for  $0^\circ \leq x \leq 180^\circ$

Which one?

Circle the correct letter.



(Total 1 mark)

- 2)  $c$  is a positive integer.

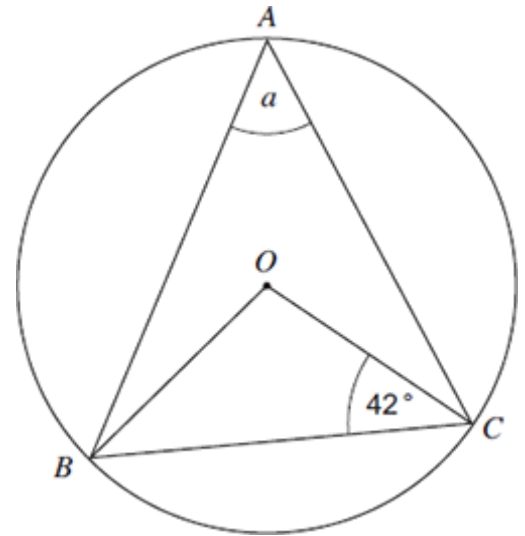
Prove that  $\frac{6c^3 + 30c}{3c^2 + 15}$  is an even number.

(Total 3 marks)

- 3) The diagram shows a circle, centre  $O$ .

Not drawn  
accurately

Work out the value of  $a$ .

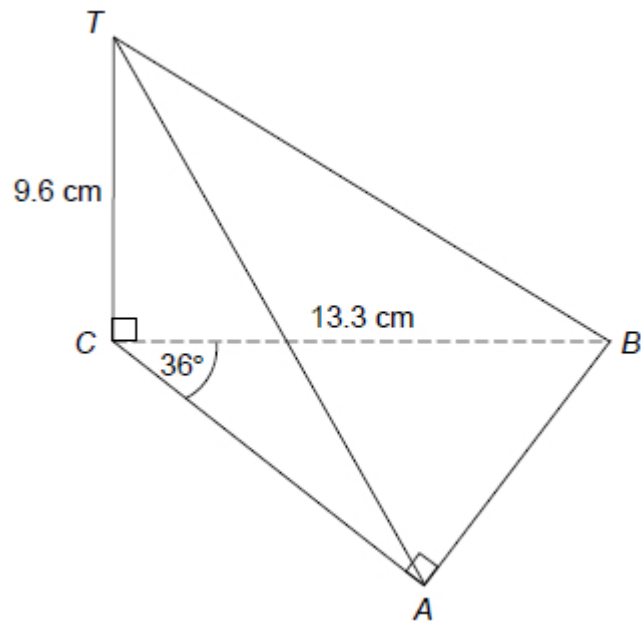


(Total 3 marks)

- 4) Solve  $\frac{6}{x-2} - \frac{2}{x+3} = 1$

(Total 5 marks)

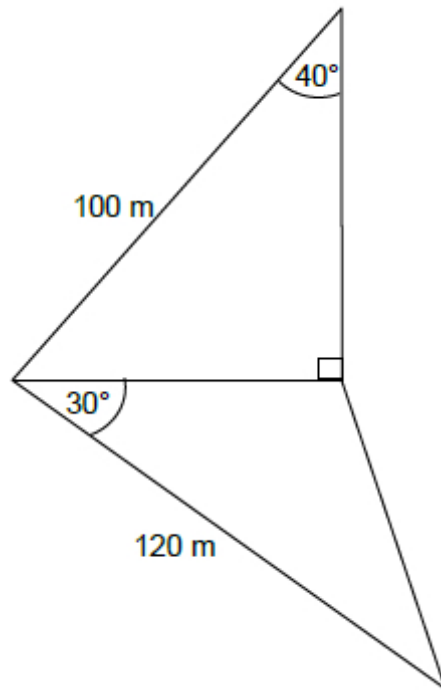
- 5) This 3D diagram represents a paperweight.  
The horizontal base  $ABC$  is a right-angled triangle.  
 $CT$  is vertical.  
Angle  $ACB = 36^\circ$ ,  $BC = 13.3$  cm and  $CT = 9.6$  cm.



Work out the size of the angle between  $AT$  and the horizontal base.

(Total 4 marks)

6) Two triangular lawns are shown.  
Wire fencing is needed for all **five** sides.



Not drawn  
accurately

Wire fencing is sold in 50-metre rolls.

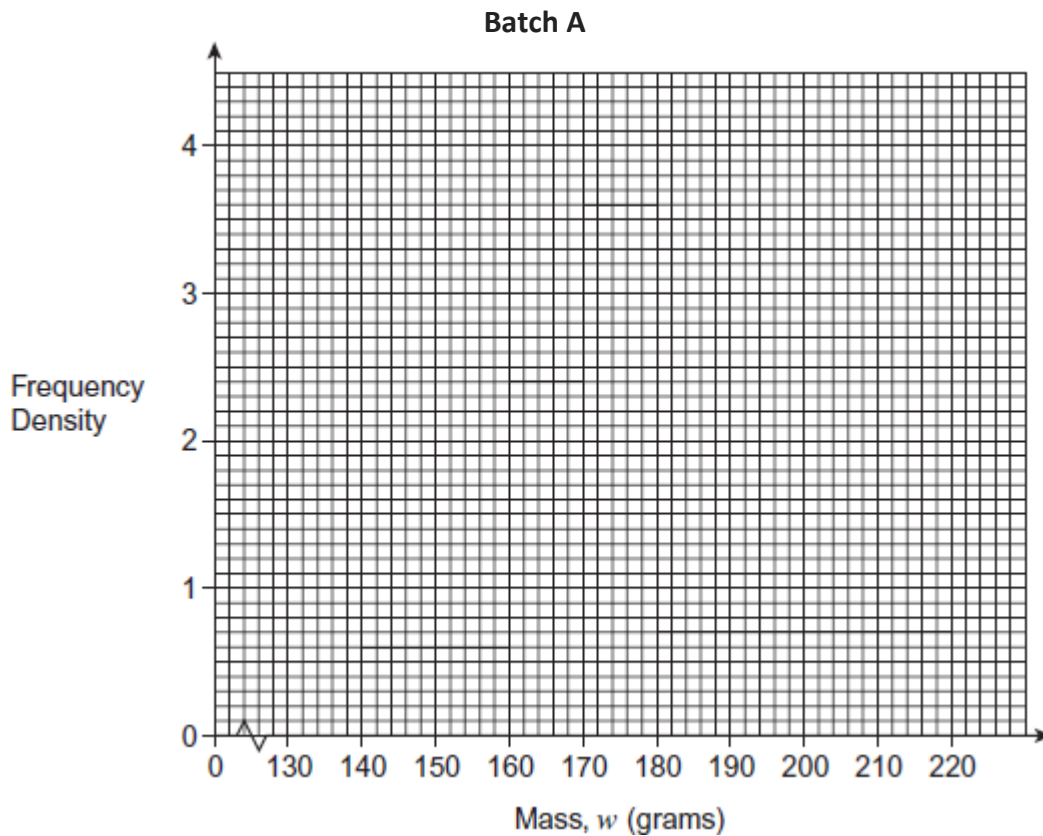
Work out the number of rolls needed.

(Total 6 marks)

7) The table shows information about the masses of 100 oranges in Batch A.

Mass, $w$ (grams)	Frequency
$140 \leq w < 160$	13
$160 \leq w < 170$	40
$170 \leq w < 180$	33
$180 \leq w < 220$	14

(a) Draw a histogram to represent this data.



(3)

(b) Ben states that 20% of the oranges weigh more than 175 g to the nearest gram.

Is his claim correct?

(You must show working to support your answer)

(2)

(Total 5 marks)

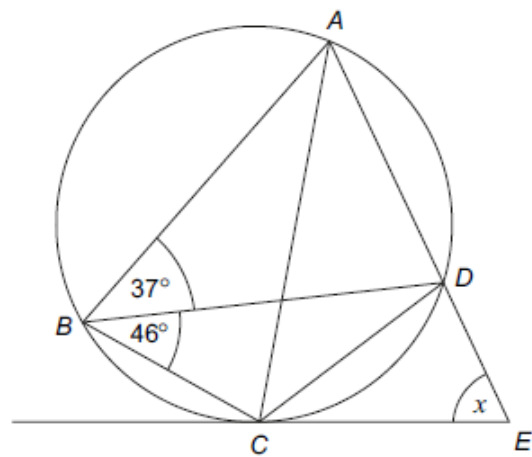
8)

The diagram shows a cyclic quadrilateral  $ABCD$ .

$ADE$  is a straight line.

$CE$  is a tangent to the circle.

Work out the size of angle  $x$ .



Not drawn  
accurately

(Total 3 marks)

9) £4000 is invested at 2% compound interest.

Calculate the value of the investment after 3 years.

£ \_\_\_\_\_  
(3)

10)

The ages of Adam, Ben and Caleb are in the ratio 5:7:11.

Next year, they will be in the ratio 8:11:17. How old are they all now?

Adam \_\_\_\_\_ years      Ben \_\_\_\_\_ years      Caleb \_\_\_\_\_ years

(4 marks)



**11)**  $y$  is inversely proportional to  $x$  for positive values.

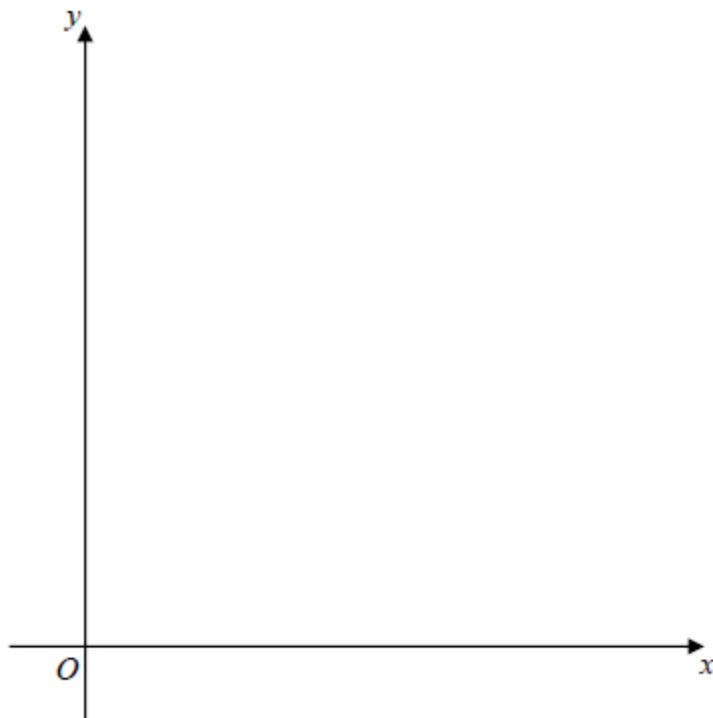
When  $x = 3.5$ ,  $y = 4.2$

(a) Work out the value of  $y$  when  $x = 5.6$

Answer \_\_\_\_\_

**(3)**

(b) On the grid draw a sketch to show the relationship between  $y$  and  $x$ .



**(1)**

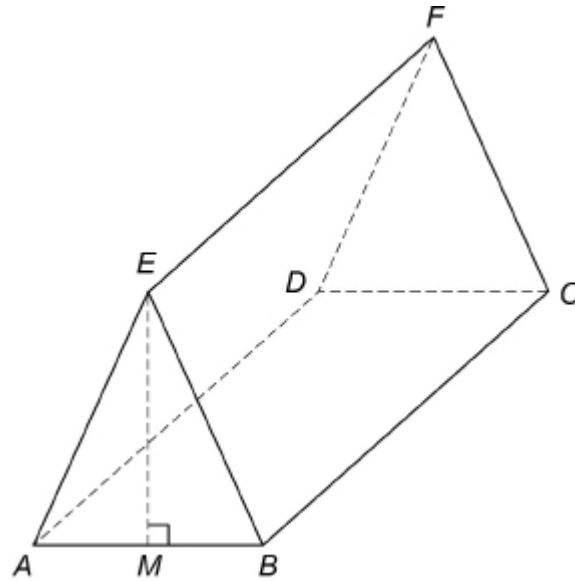
**(Total 4 marks)**

12) Rectangle  $ABCD$  is the horizontal base of a triangular prism  $ABCDEF$ .

$AE = BE$

$E$  is vertically above  $M$ , the midpoint of  $AB$ .

$AB = 16$  cm     $AE = 17$  cm     $BC = 30$  cm



(a) Show that  $EM = 15$  cm

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(2)

(b) Work out the size of angle  $ECM$ .

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Answer \_\_\_\_\_ degrees

(4)

(Total 6 marks)

13) Here are six cards.



Two cards are picked at random.

(a) Assume that the first card chosen is not replaced.

Work out the probability that both cards are B.

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Answer \_\_\_\_\_

(3)

(b) In fact the first card was replaced.

How does this affect the answer to part (a)?

Tick a box

Show working to support your answer.

- Probability is now bigger
- Probability stays the same
- Probability is now smaller

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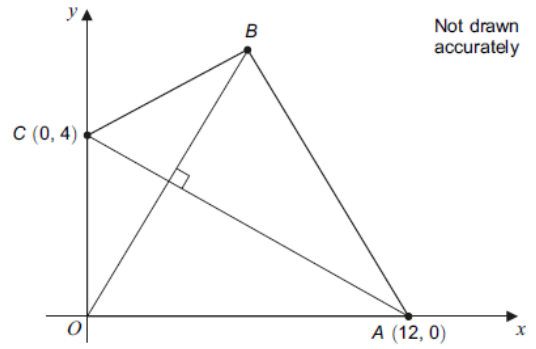
(2)

(Total 5 marks)

14)

$OABC$  is a kite.

(a) Work out the equation of  $AC$ .



Answer \_\_\_\_\_ (2)

(b) Calculate the area of the kite

Answer \_\_\_\_\_  $\text{cm}^2$

(2)

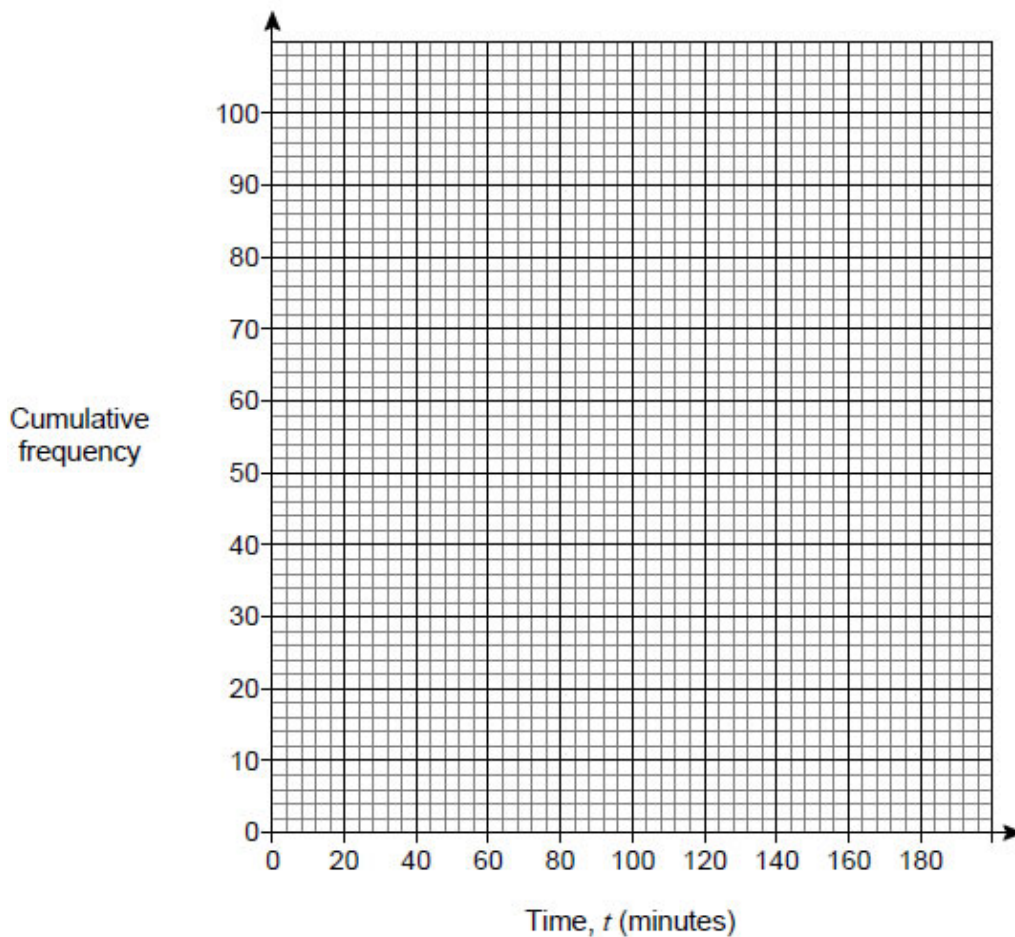
(Total 4 marks)

15) The table shows the running times of some films.

(a) Draw a cumulative frequency graph on the grid below to represent the data.

(3)

Time, $t$ (minutes)	Number of films	
$0 \leq t < 80$	0	
$80 \leq t < 100$	8	
$100 \leq t < 120$	30	
$120 \leq t < 140$	34	
$140 \leq t < 160$	19	
$160 \leq t < 180$	9	



(b) Estimate the number of these films with a running time of less than 2 ½ hours.

Answer \_\_\_\_\_

(1)

(Total 4 marks)

16) Solve  $5x - y = 5$   
 $2y - x^2 = 11$

You **must** show your working.  
Do **not** use trial and improvement.

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Answer \_\_\_\_\_

(Total 6 marks)

**END OF QUESTION PAPER**  
**Now check your working carefully**