

ELGIN ACADEMY

Prelim Examination 2010 / 2011

MATHEMATICS Standard Grade - General Level

Paper I

Time Allowed - 35 minutes

First name and initials

Surname

Class

Teacher

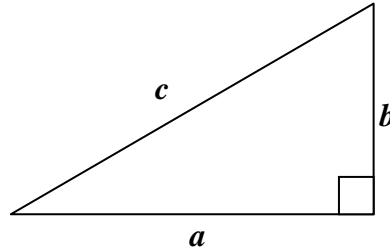
Read Carefully

1. Answer as many questions as you can.
2. Write your answers in the spaces provided.
3. Full credit will be given only where the solution contains appropriate working.
4. **You may not use a calculator.**

FORMULAE LIST

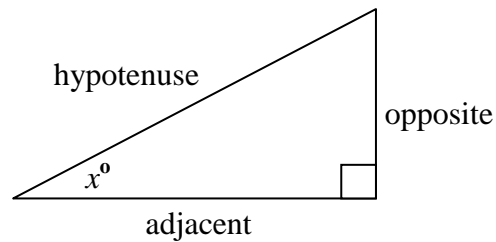
Circumference of a circle:	$C = \pi d$
Area of a circle:	$A = \pi r^2$
Curved surface area of a cylinder:	$A = 2\pi r h$
Volume of a cylinder:	$V = \pi r^2 h$
Volume of a triangular prism:	$V = Ah$

Theorem of Pythagoras:



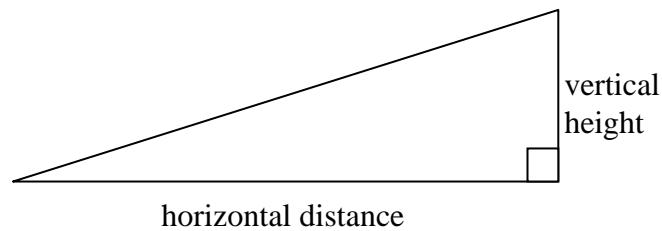
$$a^2 + b^2 = c^2$$

Trigonometrical ratios
in a right angled
triangle:



$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$
$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Gradient:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

		KU	RE
1. Carry out the following calculations.	(a) 15% of £762		
		(2)	
	(b) $6 \times (-7)$		
		(1)	
	(c) 2.7×60		
		(1)	
2. (a) Multiply the brackets and simplify. $5(x - 6) + 2(x - 3)$			
		(3)	
	(b) Find the value of $2x^2 - 5$ when $x = 3$.		
		(2)	

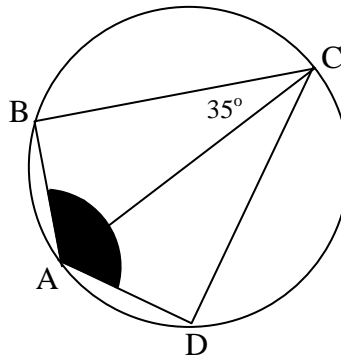
3. Write these in order starting with the smallest.

36% $\frac{2}{5}$ 0.35

KU	RE
(2)	

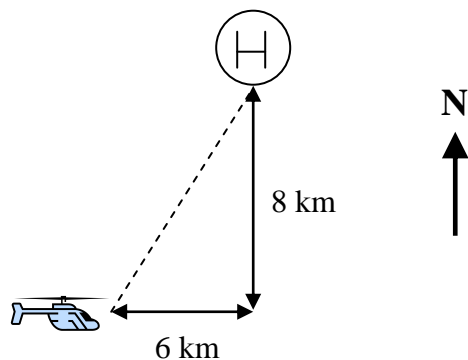
4. The diagram shows a kite ABCD inscribed in a circle with AC as diameter. B and D lie on the circumference of the circle.

If angle $BCA = 35^\circ$, calculate the size of angle BAD (the shaded angle).



(3)

5. (a) Frank is flying a helicopter. Air traffic control say he is 8 km south and 6 km west of the helipad.



What is the shortest distance he can fly to get back to the helipad?

(4)

KU	RE

5. (cont.)

As part of the celebrations 176 000 people attended the Royal Highland Show.

(b) Write this number in Standard Form.

(2)

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6. A survey was carried out by a GP surgery to find how many times people visited the doctor in a year.

The results are shown in the table.

Number of Visits	0	1	2	3	4	5	6
Number of People	3	7	11	11	13	4	1

(a) Calculate the mean number of visits per year.

(3)

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(b) What percentage of these people visited the doctor less than 3 times in a year?

(3)

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	KU	RE

7. A hand held games machine can be purchased for £158 cash. It can also be paid for by paying a deposit of £23 and then the remainder in 9 equal monthly instalments.

Calculate how much each instalment should be.

(4)

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END OF QUESTION PAPER

ELGIN ACADEMY

Prelim Examination 2010 / 2011

MATHEMATICS Standard Grade - General Level

Paper II

Time Allowed - **55 minutes**

First name and initials

Surname

Class

Teacher

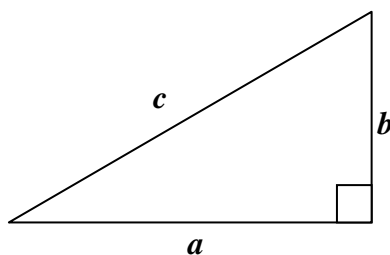
Read Carefully

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4. **You may use a calculator.**

FORMULAE LIST

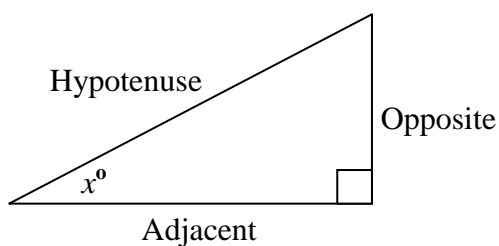
Circumference of a circle: $C = \pi d$
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Volume of a triangular prism: $V = Ah$

Theorem of Pythagoras:



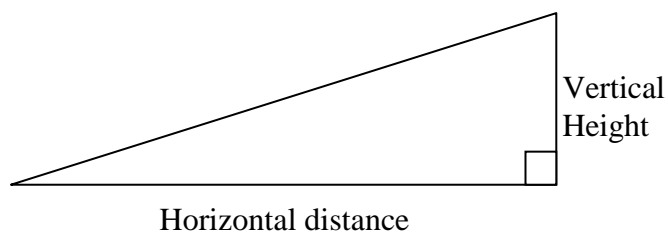
$$a^2 + b^2 = c^2$$

Trigonometrical ratios
in a right angled
triangle:



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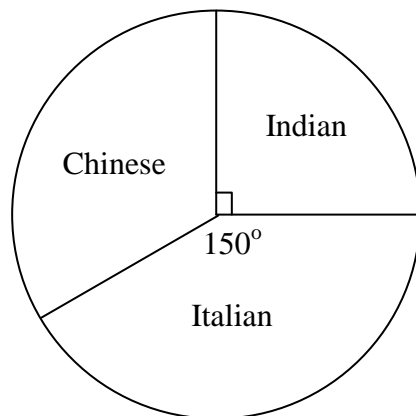
Gradient:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$



1. 720 people were surveyed and asked for their favourite take away food. The results are shown in the pie chart.



- (a) How many people preferred Indian?

(1)

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- (b) How many more people preferred Chinese to Indian?

(3)

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2. 6 friends decided to go skating. The total cost of admission was £25.50. At the last minute, 2 more people decided to join in.

How much would it now cost for admission?

(3)

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KU	RE
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3. The Mutley Crew pet company offer a Pet Taxi service.

It charges an £8 pick up fee plus 40p per mile travelled.

- (a) Calculate how much it would cost to have your dog picked up and taken to a destination 50 miles away.

(2)

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- (b) Sanjay paid £20.80 to have his cat picked up and taken to his girlfriend's house.

How far from Sanjay's house did his girlfriend stay?

(2)

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4. Make them smaller Models are made to a scale of 1: 500.

A model of the Eiffel Tower is 65cm tall.

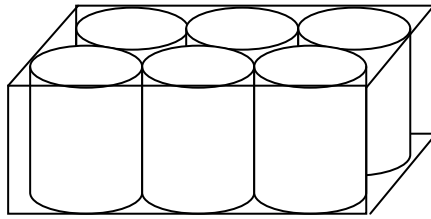
What is the actual height of it in metres?



(2)

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5. Six glass cylinders, each of radius 8cm and height 12cm, fit exactly into a rectangular box as shown in the diagram.



- (a) (i) Write down the length, breadth and height of the box.

(2)

- (ii) Find the volume of the box.

(2)

The cylinders have to be surrounded with protective packaging.

- (b) Calculate the volume of packaging required to completely fill up the box. Round your answer to one decimal place.

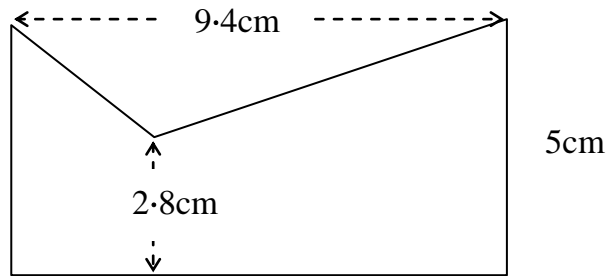
(4)

KU	RE

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KU	RE
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6. Calculate the area of this shape which consists of a rectangle with a triangle cut out of it. The measurements are as shown in the diagram.



(4)

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7. At 1:15 pm David is stopped by the police who think that he may have witnessed an accident earlier in the day. The accident happened at 11:30 am at a place 75 miles away.

If David had been sticking to the speed limit of 40 m.p.h., could he have witnessed the accident?

YOU MUST SHOW ALL YOUR WORKING AND GIVE A REASON FOR YOUR ANSWER



(3)

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	KU	RE

8. (a) Solve algebraically $7x - 4 = 2x + 6$

(2)

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(b) Factorise fully $45 - 10m$.

(2)

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9. A plumber uses this table to calculate the charges for carrying out work. He charges a call out charge plus a charge for every hour the work takes.

(a) Complete the table:

Number of hours worked (n)	1	2	3	4	5		10
Cost (£ C)	37	49	61	73			

(2)

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(b) Find a formula for calculating the cost when you know the number of hours a piece of work will take.

(2)

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	KU	RE

10. (a) Complete the table below for $y = 3x - 1$.

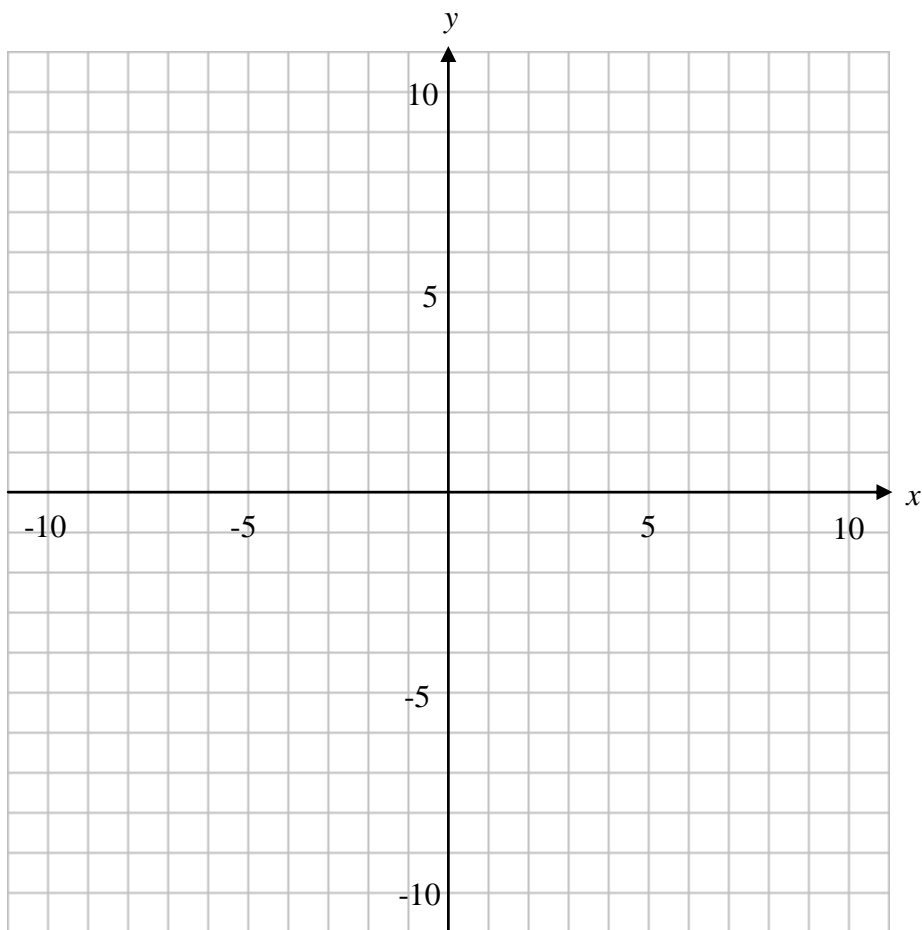
x -2 0 2

y

(1)

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(b) Using the table in part (a), draw the graph of the line $y = 3x - 1$ on the grid below.

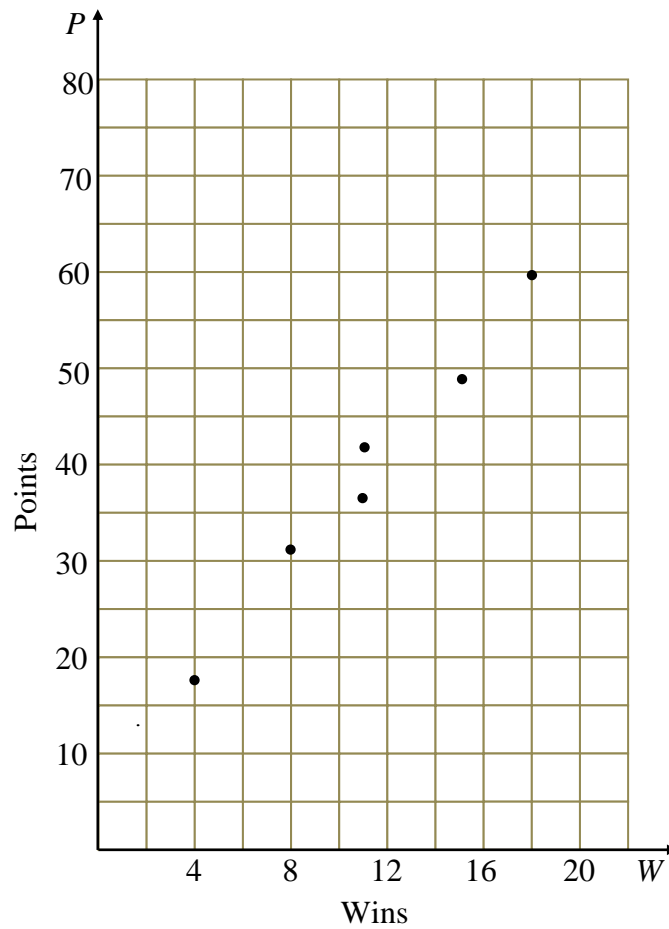


(2)

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	KU	RE

11. A selection of the number of games won and the total points gained by teams in the Scottish Premier League was plotted on this scattergraph.



- (a) One team won 14 games and scored 42 points. Mark this information on the scattergraph with an X.

(1)

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- (b) Draw the line of best fit on the scattergraph.

(1)

--	--

- (c) Another team won 10 games.
Use your line of best fit to estimate how many points that team were likely to have scored.

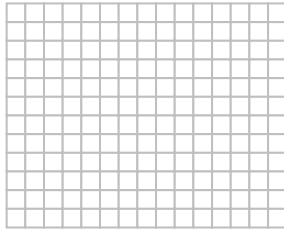
(1)

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12. Lucy is making a grid to be used to raise money for charity. The grid is a rectangle

KU	RE

15 squares long and 12 squares broad.

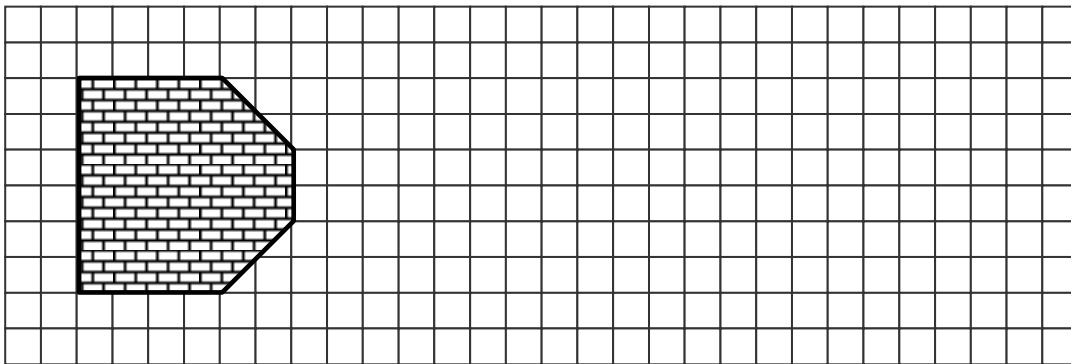


If the probability of choosing a winning square is 0.2, how many winning squares are there on the board?

(2)

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13. Draw an enlargement of this shape using a Scale Factor of 1.5.



(2)

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14. Alan's dad set him a challenge to find out the height of the horse statue on the

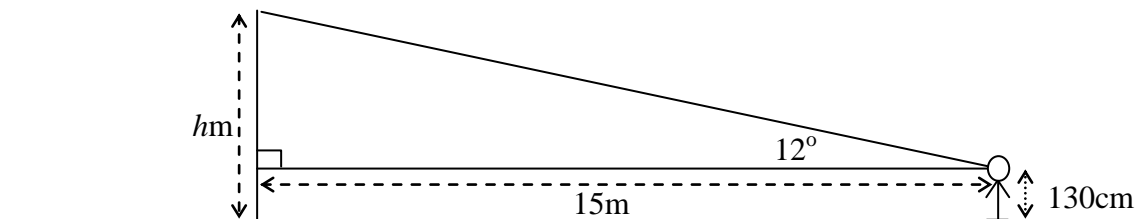
KU	RE

M8 motorway near Glasgow.

To meet this challenge Alan stood a distance of 15 metres from the statue and measured the angle to the top of the statue to be 12° using a clinometer.



If the height to Alan's eye level is 130cm, calculate the height of the statue.



(4)

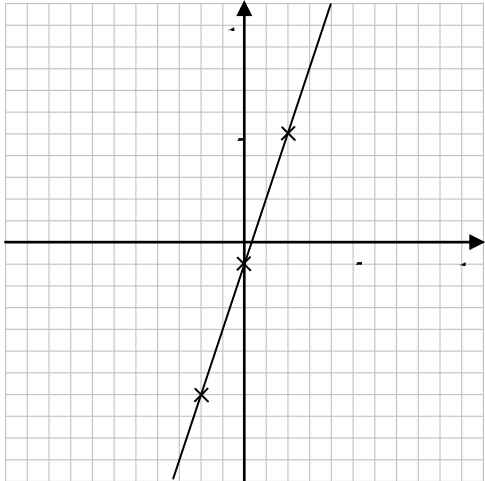


<p>1(a)</p>	<p>ans: £114.30</p> <ul style="list-style-type: none"> ●¹ finds 10% ●² finds 5% and adds 	<ul style="list-style-type: none"> ●¹ £76.20 ●² £38.10 + £76.20 = £114.30 <p>2KU</p>
<p>1(b)</p>	<p>ans: - 42</p> <ul style="list-style-type: none"> ●¹ answer 	<ul style="list-style-type: none"> ●¹ - 42 <p>1KU</p>
<p>1(c)</p>	<p>ans: 162</p> <ul style="list-style-type: none"> ●¹ answer 	<ul style="list-style-type: none"> ●¹ 162 <p>1KU</p>
<p>2(a)</p>	<p>ans: $7x - 36$</p> <ul style="list-style-type: none"> ●¹ multiplies first bracket ●² multiplies second bracket ●³ simplifies to answer 	<ul style="list-style-type: none"> ●¹ $5x - 30 \dots\dots$ ●² $\dots\dots + 2x - 6$ ●³ $7x - 36$ <p>3KU</p>
<p>2(b)</p>	<p>ans: 13</p> <ul style="list-style-type: none"> ●¹ substitutes for x ●² evaluates 	<ul style="list-style-type: none"> ●¹ $2(3)^2 - 5$ ●² 13 <p>2KU</p>
<p>3</p>	<p>ans: 0.35, 36%, 2/5</p> <ul style="list-style-type: none"> ●¹ attempts to change all into similar format ●² answer 	<ul style="list-style-type: none"> ●¹ all changes to fr./dec./% ●² 0.35, 36%, 2/5 <p>2RE</p>
<p>4</p>	<p>ans: 110°</p> <ul style="list-style-type: none"> ●¹ realises angle B is right ●² finds angle BAC ●³ answer 	<ul style="list-style-type: none"> ●¹ angle B is right [stated/implied] ●² angle BAC = $180 - (35 + 90) = 55^\circ$ ●³ 110° <p>3RE</p>
<p>5(a)</p>	<p>ans: 10km</p> <ul style="list-style-type: none"> ●¹ knows to use Pythagoras ●² knows to square distances ●³ evaluates correctly ●⁴ correct answer 	<ul style="list-style-type: none"> ●¹ evidence ●² $6^2 + 8^2$ ●³ $\sqrt{100\text{km}}$ ●⁴ 10km <p>4RE</p>
<p>5(b)</p>	<p>ans: 1.76×10^5</p> <ul style="list-style-type: none"> ●¹ correct number between 1 and 10 ●² correct power of 10 	<ul style="list-style-type: none"> ●¹ 1.76 ●² 10^5 <p>2KU</p>
<p>6(a)</p>	<p>ans: 2.8</p> <ul style="list-style-type: none"> ●¹ finds fx for each entry in table and totals ●² knows to divide by 50 ●³ answer 	<ul style="list-style-type: none"> ●¹ $7 + 22 + 33 + 52 + 20 + 6 = 140$ ●² $140 \div 50$ ●³ 2.8 <p>3KU</p>

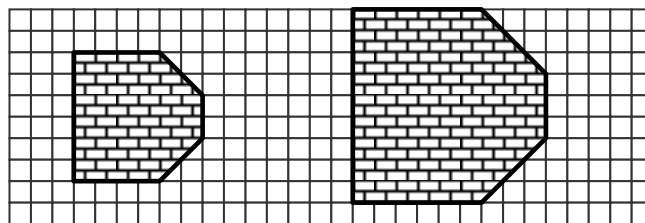
6(b)	ans: 42% <ul style="list-style-type: none"> ●¹ finds total less than 3 visits ●² knows how to make % ●³ answer 	<ul style="list-style-type: none"> ●¹ $3 + 7 + 11 = 21$ ●² $21/50 \times 100\%$ ●³ 42% <p style="text-align: right;">3RE</p>
7	ans: £15 <ul style="list-style-type: none"> ●¹ knows to deduct deposit ●² answer ●³ knows to divide by 9 ●⁴ answer 	<ul style="list-style-type: none"> ●¹ $158 - 23$ ●² £135 ●³ $135 \div 9$ ●⁴ £15 <p style="text-align: right;">4RE</p>

Total marks: KU 14 RE 16

	Give 1 mark for each •	Illustrations for awarding each mark
1(a)	<p>ans: 180</p> <ul style="list-style-type: none"> ●¹ finds quarter of 720 	<ul style="list-style-type: none"> ●¹ 180 1KU
1(b)	<p>ans: 60</p> <ul style="list-style-type: none"> ●¹ finds angle for Chinese ●² finds number for Chinese ●³ finds difference 	<ul style="list-style-type: none"> ●¹ 120° ●² $720 \div 3 = 240$ ●³ $240 - 180 = 60$ 3RE
2(a)	<p>ans: £34</p> <ul style="list-style-type: none"> ●¹ finds cost for 1 person ●² uses correct number in multiplication ●³ answer 	<ul style="list-style-type: none"> ●¹ $£25.50 \div 6 = £4.25$ ●² $£4.25 \times 8$ ●³ £34 3KU
3(a)	<p>ans: £28</p> <ul style="list-style-type: none"> ●¹ interprets information ●² simplifies fraction 	<ul style="list-style-type: none"> ●¹ $£8 + 50 \times 40p$ ●² £28 2KU
3(b)	<p>ans: 32 miles</p> <ul style="list-style-type: none"> ●¹ knows to deduct £8 ●² knows to divide to answer 	<ul style="list-style-type: none"> ●¹ £12.80 ●² $12.8 \div 0.4$ or $1280 \div 40 = 32$ 2RE
4	<p>ans: 325m</p> <ul style="list-style-type: none"> ●¹ knows to multiply ●² changes to metres 	<ul style="list-style-type: none"> ●¹ $500 \times 65 = 32500$ cm ●² 325 m 2KU
5(a)	<p>ans: $48 \times 32 \times 12$</p>	
(i)	<ul style="list-style-type: none"> ●¹ any two correct ●² third correct 	<ul style="list-style-type: none"> ●¹ 48cm, 32cm ●² 12cm 2KU
(ii)	<p>ans: 18432cm³</p> <ul style="list-style-type: none"> ●¹ knows how to find volume ●² answer 	<ul style="list-style-type: none"> ●¹ $48 \times 32 \times 12$ ●² 18432 cm³ 2KU
5(b)	<p>ans: 3962.9cm³</p> <ul style="list-style-type: none"> ●¹ finds volume of one cylinder ●² finds volume of six cylinders ●³ subtracts from volume of box ●⁴ rounds answer correctly 	<p style="text-align: right;">[$\pi = 3.14$]</p> <ul style="list-style-type: none"> ●¹ $3.14 \times 8^2 \times 12 = 2411.52\text{cm}^3$ ●² $2411.52 \times 12 = 14469.12\text{cm}^3$ ●³ $18432 - 14469.12 = 3962.88\text{cm}^3$ ●⁴ 3962.9 cm³ 4RE
6	<p>ans: 36.66cm²</p> <ul style="list-style-type: none"> ●¹ finds area of rectangle ●² finds height of triangle ●³ finds area of triangle ●⁴ subtracts to answer 	<ul style="list-style-type: none"> ●¹ $9.4 \times 5 = 47\text{cm}^2$ ●² $5 - 2.8 = 2.2\text{cm}$ ●³ $\frac{1}{2} \times 9.4 \times 2.2 = 10.34$ ●⁴ 36.66 cm^2 4KU

7	ans: no; could only have travelled 70 miles <ul style="list-style-type: none"> ●¹ knows to find distance ●² uses correct decimal of an hour ●³ valid conclusion with reason 	<ul style="list-style-type: none"> ●¹ $D = S \times T$ ●² $[40 \times 1.75] = 70$ miles ●³ couldn't have been witness with reason <p style="text-align: right;">3RE</p>								
8(a)	ans: $x = 6$ <ul style="list-style-type: none"> ●¹ starts to solve ●² completes solution 	<ul style="list-style-type: none"> ●¹ $5x = 10$ ●² $x = 2$ <p style="text-align: right;">2KU</p>								
8(b)	ans: $5(9 - 2m)$ <ul style="list-style-type: none"> ●¹ correct common factor ●² correct bracket 	<ul style="list-style-type: none"> ●¹ $5(\dots\dots\dots)$ ●² $\dots(9 - 2m)$ <p style="text-align: right;">2KU</p>								
9(a)	ans: 85; 145 <ul style="list-style-type: none"> ●¹ first entry correct ●² second entry correct 	<ul style="list-style-type: none"> ●¹ 85 ●² 145 <p style="text-align: right;">2RE</p>								
9(b)	ans: $C = 12n + 25$ <ul style="list-style-type: none"> ●¹ correct multiplier ●² correct correction 	<ul style="list-style-type: none"> ●¹ $12n\dots\dots\dots$ ●² $\dots\dots + 25$ <p style="text-align: right;">2RE</p>								
10(a)	ans: $y = -7, -1, 5$ <table style="margin-left: 40px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">x</td> <td style="padding-right: 20px;">-2</td> <td style="padding-right: 20px;">0</td> <td>2</td> </tr> <tr> <td>y</td> <td>-7</td> <td>-1</td> <td>5</td> </tr> </table> <ul style="list-style-type: none"> ●¹ correct values in table 	x	-2	0	2	y	-7	-1	5	<ul style="list-style-type: none"> ●¹ $y = -7, -1, 5$ <p style="text-align: right;">1KU</p>
x	-2	0	2							
y	-7	-1	5							
10(b)	ans: 	<ul style="list-style-type: none"> ●¹ plots points correctly ●² draws straight line <p style="text-align: right;">1KU</p>								
		<ul style="list-style-type: none"> ●¹ points plotted ●¹ line drawn <p style="text-align: right;">1KU</p>								

<p>11(a)</p>	<p>ans: X at (14, 42)</p> <ul style="list-style-type: none"> ●¹ point marked on graph 	<ul style="list-style-type: none"> ●¹ point marked at (14,42) 1KU
<p>11(b)</p>	<p>ans: line of best fit drawn</p> <ul style="list-style-type: none"> ●¹ line of best fit drawn 	<ul style="list-style-type: none"> ●¹ any reasonable line drawn 1KU
<p>11(c)</p>	<p>ans: ~35 points</p> <ul style="list-style-type: none"> ●¹ interpolates graph 	<ul style="list-style-type: none"> ●¹ ~35 points 1KU
<p>12</p>	<p>ans: 36 squares</p> <ul style="list-style-type: none"> ●¹ finds total squares on board ●² finds number of winning squares 	<ul style="list-style-type: none"> ●¹ $15 \times 12 = 180$ ●² $180 \div 0.2 = 36$ squares 2RE
<p>13</p>	<p>ans: diagram drawn</p> <ul style="list-style-type: none"> ●¹ straight lines correct ●² diagonal lines correct 	<ul style="list-style-type: none"> ●¹ see diagram at end ●² see diagram at end 2RE
<p>14</p>	<p>ans: 4.49m</p> <ul style="list-style-type: none"> ●¹ knows to use SOH CAH TOA ●² uses correct ratio ●³ finds length ●⁴ adds Alan's height 	<ul style="list-style-type: none"> ●¹ evidence ●² $15 \times \tan 12^\circ$ ●³ 3.19 ●⁴ 4.49m 4RE



Total marks: KU 26 RE 24

Total Marks for Papers I and II: KU 40 RE 40

Standard Grade General Paper 1 - Marks Grid**2010/2011**

Question Number	KU	RE
1(a)		
1(b)		
1(c)		
2(a)		
2(b)		
3		
4		
5(a)		
5(b)		
6(a)		
6(b)		
7		
Total	/14	/16

Question Number	KU	RE
1(a)		
1(b)		
2		
3(a)		
3(b)		
4		
5(a)(i)		
5(a)(ii)		
5(b)		
6		
7		
8(a)		
8(b)		
9(a)		
9(b)		
10(a)		
10(b)		
10(c)		
11(a)		
11(b)		
11(c)		
12		
13		
14		
Total	/26	/24

