General Mathematics - Practice Examination D

Please note … the format of this practice examination is the same as the current format. The paper timings are the same, as are the marks allocated.
Calculators may only be used in Paper 2.

MATHEMATICS
Standard Grade - General Level

Paper I

Time Allowed - 35 minutes

First name and initials

Surname

Class

Teacher

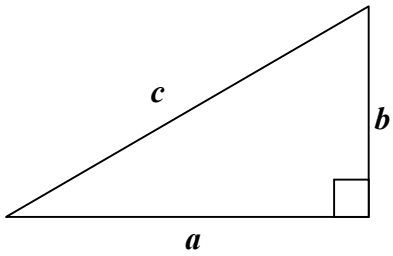
Read Carefully

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

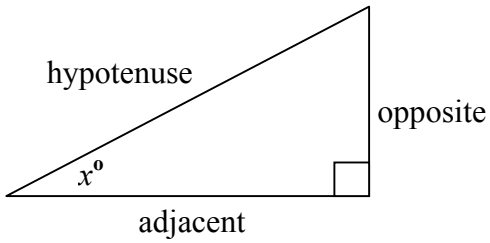
Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi r h$
Volume of a cylinder: $V = \pi r^2 h$
Volume of a triangular prism: $V = Ah$

Theorem of Pythagoras:



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

Trigonometrical ratios in a right angled triangle:

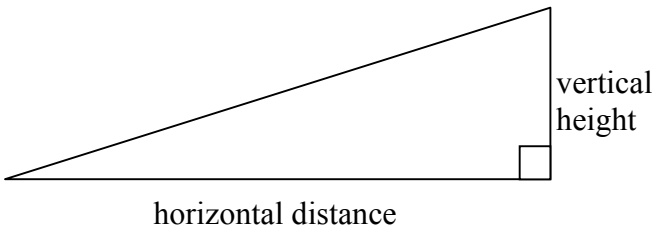


$$\tan x^o = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^o = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^o = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Gradient:



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

	KU	RE

1. Carry out the following calculations.

(a) 40% of £120 — **2**

(b) $6 + 19 \cdot 42 - 3 \cdot 7$ — **1**

(c) $0 \cdot 71 \times 50$ — **1**

(d) $43.96 \div 7$ — **1**

2. Mike decided to play 9 holes on his local golf course.
A score of +2 would mean that he was 2 shots above par for a certain hole.
A score of −1 would mean that he was 1 shot below par for a certain hole.

For the nine holes Mike's "scores to par" were as follows:-

+1 , -2 , 0 , +3 , +1 , -1 , +1 , +2 , +4

Calculate Mike's average score "to par" for a hole. — **3**

3. Julie works in her local supermarket.
She works a basic week of 30 hours.
She is paid £3.80 per hour.
All overtime is paid at double time.

(a) One week Julie works 35 hours.
Calculate her gross pay. — **4**

(b) Julie works different shifts every day.
Shown opposite is her shifts for a particular week.

Julie slept in on Friday morning and was 30 minutes late for work.

Assuming she does not get paid for her missing minutes, calculate her wages for this week. — **3**

JULIE WATT

MONDAY	0900 - 1200
TUESDAY	1200 - 1900
WEDNESDAY	1030 - 1800
THURSDAY	0930 - 1430
FRIDAY	0900 - 1700

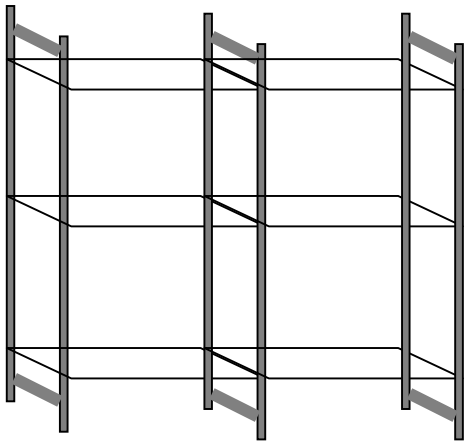
KU	RE

4. A secondary school has a roll of 574 pupils.
$\frac{4}{7}$ of them are boys.

How many boys are there ?

2

5. A wooden shelving unit is made by joining side panels and shelves, as shown below.



The shelves shown in the diagram have three side panels and six shelves.

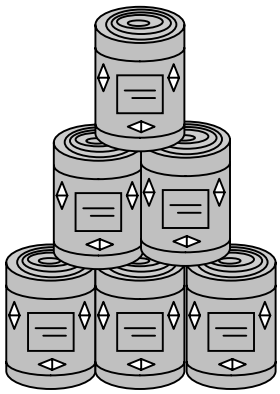
(a) Complete the following table.

Number of side panels (P)	2	3	4	5		20
Number of shelves (S)		6		12		

2

(b) Write down a formula for the number of shelves, *S*, when you know the number of side panels , *P*.

2

	KU	RE
6. (a) Solve algebraically $4x - 7 \leq 13$.	**2**	
(b) Factorise fully $9a^2 - 12b$	**2**	
7. If 9 litres of petrol costs £6.21. Find the cost of 20 litres of petrol.	**3**	
8. A supermarket displays tins of beans as shown below. ← This display has 3 rows and 6 tins  Each tin is 12 cm high. The manager wants the display to be 1·08 metres high. How many tins of beans will there be in the completed display ?		**5**

[END OF QUESTION PAPER]

General Mathematics Practice Exam D — Marking Scheme - Paper 1

	Give 1 mark for each •	Illustration(s) for awarding each mark
1.	**(a) ans: £48** **5 KU** • 1 know how to find a commonly used whole number percentage of a quantity • 2 correct answer **(b) ans: 21.72** • 1 add and subtract decimal numbers **(c) ans: 35.5** • 1 multiply a decimal number by 10 **(d) ans: 6.28** • 1 divide a decimal number by a single whole number	• 1 0.4×120 • 2 £48 • 1 21.72 • 1 35.5 • 1 6.28
2.	**ans: 1** **3 KU** • 1 know how to find an average • 2 add numbers • 3 divide	(a) • 1 know to add numbers and divide by 9 • 2 9 • 3 1
3.	**(a) ans: £152** **4 KU** • 1 calculate basic pay • 2 interpret information • 3 calculate overtime • 4 calculate gross pay **(b) ans: £114** **3 RE** • 1 interpret table : total hours • 2 subtracting late time • 3 state or calculate wages	(a) • 1 $30 \times £3.80 = £114$ • 2 5 hours overtime • 3 $5 \times 2 \times £3.80 = £38$ • 4 $114 + 38 = £152$ (b) • 1 total 30½ hours • 2 paid for 30 hours • 3 £114 (or consistent answer)
4.	**ans: 328** **2 KU** • 1 know how to find a simple fraction of a quantity • 2 calculate a simple fraction of a quantity	• 1 $574 \times 4 \div 7$ • 2 328
5.	**(a) ans: 3 , 9 , 57** **2 RE** • 1 continue pattern • 2 extend pattern	(a) • 1 3 and 9 shelves • 2 57 shelves

	Give 1 mark for each •	Illustration(s) for awarding each mark
	(b) ans: **S = 3P - 3** **2 RE** • 1 generalise pattern • 2 generalise pattern	—— • 1 • 2 $3P - 3$ or equivalent
6.	**(a) ans:** $x \leq 5$ **2 KU** • 1 collect constants • 2 solve inequality for x **(b) ans: $3(3a^2 - 4b)$** **2 KU** • 1 common factor • 2 terms in brackets	• 1 $4x \leq 20$ • 2 $x \leq 5$ • 1 3 • 2 $3(3a^2 - 4b)$
7.	**ans: £13.80** **3 KU** • 1 knowing to use proportion • 2 dividing to find 1 litre • 3 calculating answer	• 1 • 2 £6.21 ÷ 9 = 0.69 • 3 0.69 × 20 = £13.80
8.	**ans: 45 tins** **5 RE** • 1 strategy • 2 9 rows of tins needed • 3 strategy • 4 strategy • 5 carry out strategy	• 1 know to divide 1.08 m by 12 cm • 2 9 rows of tins needed • 3 appropriate evidence eg 2 rows 1 + 2 3 rows 1 + 2 + 3 • 4 4 rows 10 tins 5 rows 15 tins • 5 9 rows needs 45 tins
		21 - KU **12 - RE** **Total 33**

General Mathematics - Practice Examination D

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Calculators may only be used in this paper.

MATHEMATICS
Standard Grade - General Level

Paper II

Time Allowed - 55 minutes

First name and initials

Surname

Class

Teacher

Read Carefully

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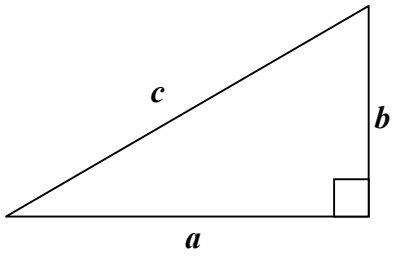

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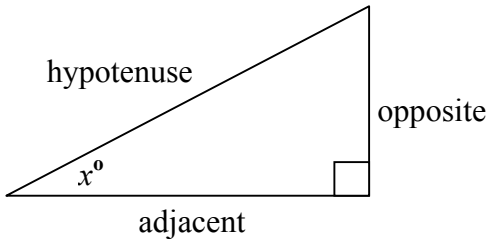

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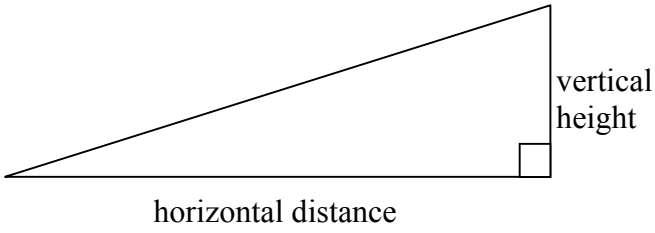
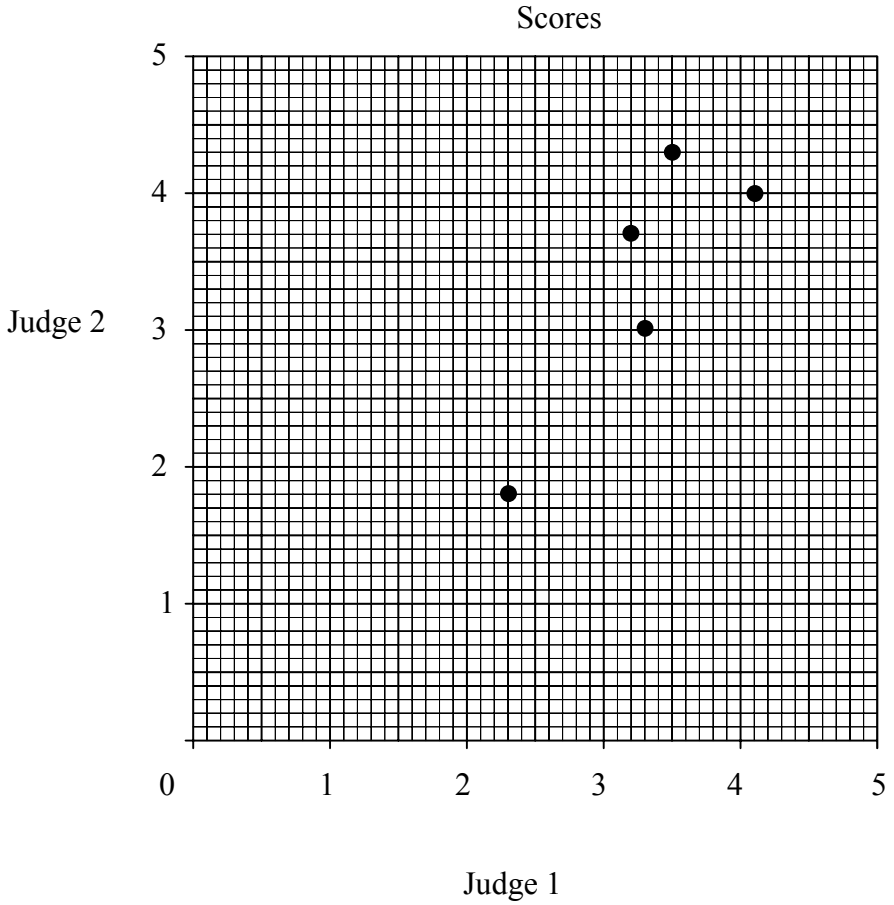


$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

KU	RE

1. Two judges, Judge 1 and Judge 2, were scoring athletes in a competition. Each judge awarded points out of 5.

The scattergraph shows the marks for five of the athletes who took part.



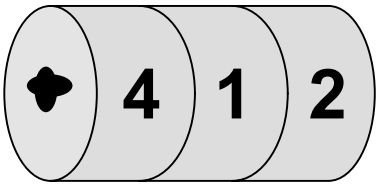
(a) Susan was given a score of $4 \cdot 3$ by Judge 1 and $4 \cdot 6$ by Judge 2.
Mark Susan's score with an **X** on the scattergraph. **1**

(b) Draw a line of best fit on the scattergraph. **1**

(c) John was scored $3 \cdot 7$ by Judge 1.
From your scattergraph estimate the score that Judge 2 may have awarded him. **1**

KU	RE

2. Mr Andrew has a safe deposit box at the local bank.
The lock on it has a 3 digit code.
Each digit can either be 1, 2, 3 or 4 .



For example, the code on the right is 412.

On Mr Andrew's lock :

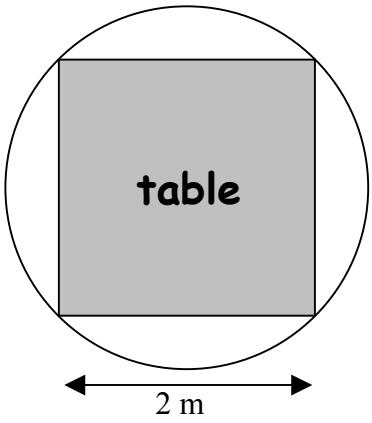
- the second digit is a multiple of 2
- the last digit is a prime number greater than 2
- no number is repeated.

Write down all the possible codes for Mr Andrew's lock.

answer

	3

3. A circular table cloth has to be designed so that it completely covers a square table with side 2 metres.
The designer wishes to use the minimum amount of material.
The diagram below shows the designers initial plan.



What is the diameter of the smallest possible tablecloth which the designer could make ?

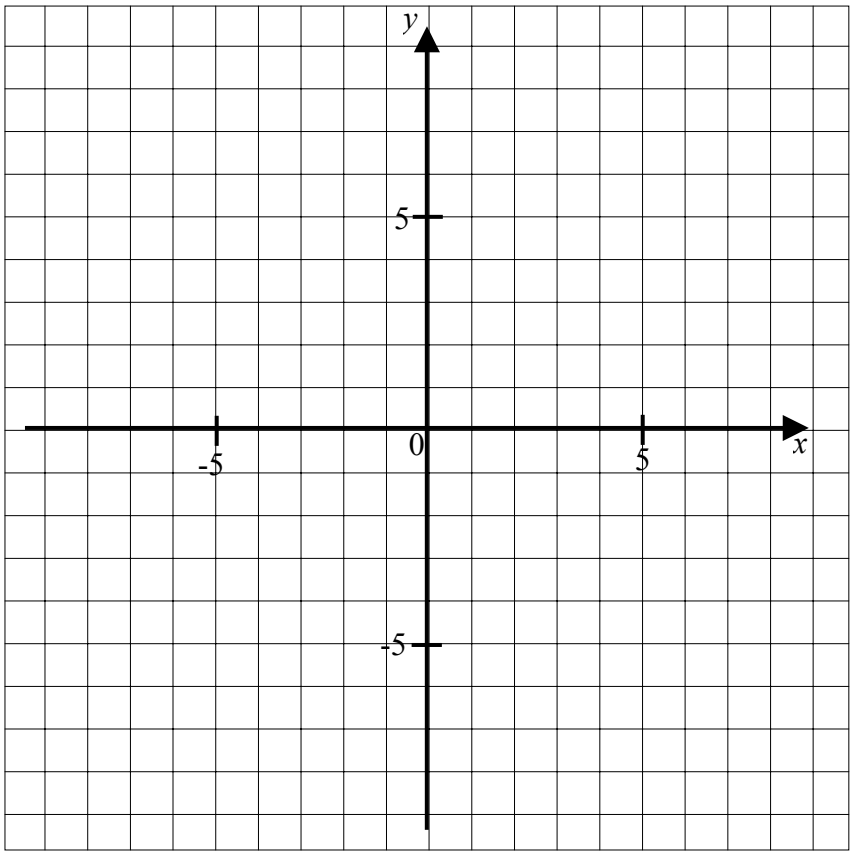
Round your answer to 1 decimal place.

	4

KU	RE

4. (a) On the grid below, plot the points

F(-6,0), G(-1,3) and H(4,6). **1**



(b) Find the gradient of the line FG. **2**

5. The shoe sizes of pupils in a maths class were recorded on a frequency table.

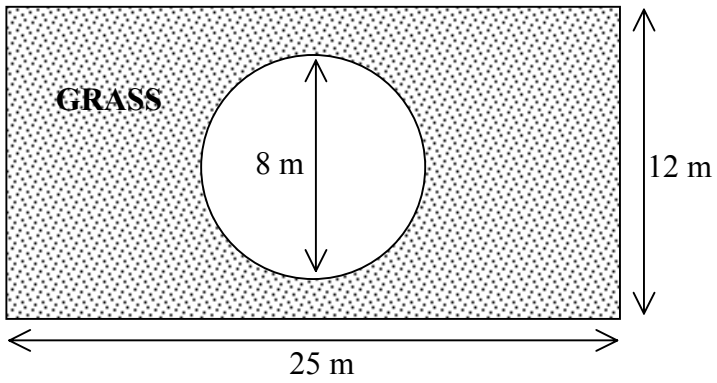
Shoe size	Frequency	Shoe size × Frequency
4	3	12
5	7	35
6	8	48
7	5	35
8	2	
	25	

(a) Complete the table and calculate the mean. **2**

(b) What was the range of the distribution ? **1**

KU	RE

6. A rectangular garden is shown below.



The garden has a rectangular shaped lawn with a circular flower bed in the centre. The diameter of the flower bed is 8 metres as shown.

Calculate the area of grass in the garden.

4

KU	RE

7. An Army helicopter leaves it's base B, on a bearing of 055° and travels 50km to a secret location S. It picks up supplies and travels 75 km in a south-easterly direction.

(a) Using a scale of **1cm to 10 km**, make a scale drawing of it's journey.

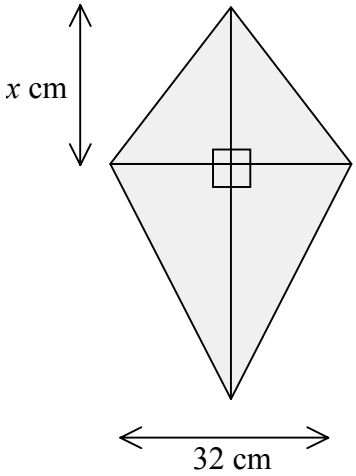
3

(b) Use your scale drawing to find the bearing that the helicopter should take in order to return directly to the army base.

2

8. The diagram shown is a design for a kite.

Calculate the length x cm.
Do not use a scale drawing.

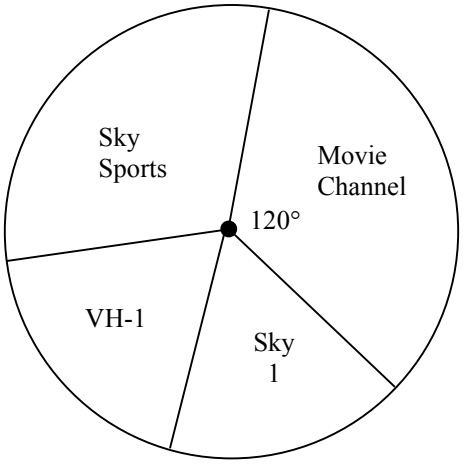


5

KU	RE

9. The pie chart shown below shows the results of a survey of "Favourite TV Channels".

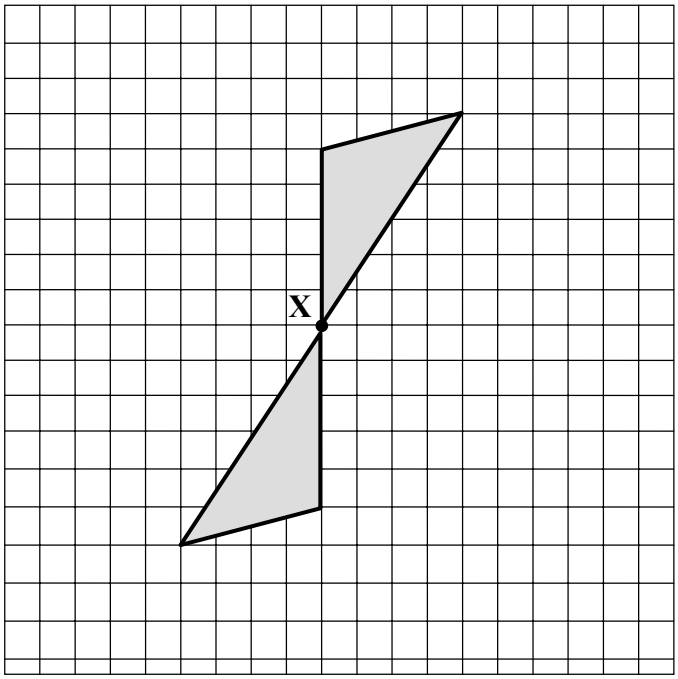
The total number of people surveyed was 1600.



Use the pie chart to calculate the number of people who preferred watch the movie channel. Round your answer to the nearest whole number.

3

10. The shape below is rotated 90° clockwise about **X.**
Draw the shape in it's new position.

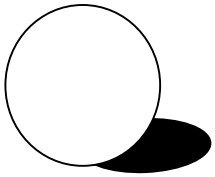


3

KU	RE

11.

READ THIS INFORMATION CAREFULLY

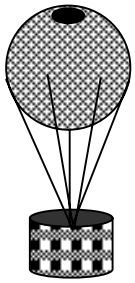


The surface area of a sphere can be calculated using the formula

$$A = 4\pi r^2$$

Where r is the radius of the sphere

The figure opposite shows a model helium balloon which is spherical in shape.



The balloon has a radius of 12 centimetres.

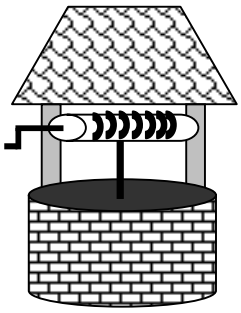
Calculate the area of material needed to make the balloon.

4

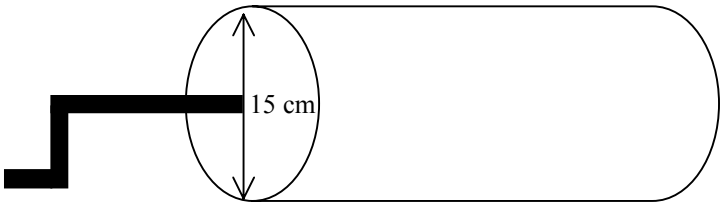
3

KU	RE

12. The wishing well shown in the diagram has a cylindrical spindle which, when turned, moves the bucket up and down the well.



An enlarged version of the spindle is shown below.
The diameter of the spindle is 15 cm.

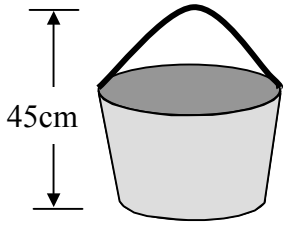


(a) Calculate the circumference of the end of the spindle.

3

(b) When the bucket is at the top, with its handle touching the spindle, the rope has wrapped around the spindle exactly 7 times.

The bucket measures 45cm from the top of the handle to its base, as shown.



The distance to the bottom of the well is $3 \cdot 8$ metres.

Can the bucket sit on the bottom of the well ?

You must give a reason for your answer.

5

[END OF QUESTION PAPER]

General Mathematics Practice Exam D **Marking Scheme - Paper 2**

	Give 1 mark for each •	Illustration(s) for awarding each mark
1.	**(c) ans: 3.9** $(\pm 0\cdot 2)$ **3 KU** (a) •1 interperet scattergraph (b) •1 draw line of best fit (c) •1 use line of best fit to estimate value	•1 mark **X** at (4.3,4.6) •1 reasonable attempt to draw line •1 value consistent with line of best fit $(\pm 0\cdot 2)$
2.	**ans: 123, 423, 143, 243** **3 RE** •1 interpret code •2 take a systematic approach •3 take a systematic approach	•1 all combinations have 2 or 4 as 2nd digit •2 all combinations end in a 3 •3 four correct codes
3.	**ans: 2.9 m** **4 RE** •1 strategy •2 carry out strategy •3 evaluate length of hypotenuse •4 round answer	•1 Pythagoras theorem •2 diameter² = 2² + 2² •3 diameter = 2.83 •4 diameter = 2.9 (must round up)
4.	**(a) ans: graph** **1 KU** •1 plot coordinate points **(b) ans:** $\frac{3}{5}$ **2 KU** •1 know how to find gradient •2 find gradient	•1 3 points correctly plotted •1 any valid method •2 correct answer
5.	**(a) ans: 5.84** **2 KU** •1 know how to calculate mean •2 calculate mean **(b) ans: 4** **1 KU** •1 calculate range	(a) •1 146 ÷ 25 •2 5.84 (b) •1 4 years
6.	**ans: 249.73 m²** **4 RE** •1 know how to calculate radius •2 know how to calculate area of a circle •3 know how to calculate area of rectangle •4 carry out subtraction	•1 4 m •2 A = π × 16 = 50.27 •3 A = 25 × 12 = 300 •4 249.73 m²

	Give 1 mark for each •	Illustration(s) for awarding each mark
7.	**(a) ans: scale drawing 3 KU** • 1 interpret bearing and draw angle correctly • 2 interpret compass point and draw angle correctly • 3 use scale **(b) ans: 2 KU** • 1 identify appropriate angle • 2 measure angle correctly	 • 1 55° (± 2°) • 2 135° (± 2°) • 3 both lines drawn correctly • 1 —— • 2 284° (± 2°)
8.	**ans: 22.9 cm 5 KU** • 1 half width of kite • 2 identify valid trogonometric ratio • 3 set up ratio • 4 evaluate trigonometric function • 5 process statement and calculate x	 • 1 16 cm • 2 tan • 3 $\tan 55° = \frac{x}{16}$ • 4 1.428m (may be implicit in next mark) • 5 $x = 16 \times \tan 55° = 22.9$ cm
9.	**ans: 533 3 KU** • 1 know how to use angle at centre • 2 carry out calculation • 3 round to nearest whole number	 • 1 $\frac{120}{360}$ • 2 533.3333 • 3 533
10.	**ans:** diagram **3 RE** • 1 rotate through 90° about X • 2 rotate through 90° about X • 3 rotate shape through 90°	 • 1 one part rotated (correct position and length) • 2. Further part rotated • 3 complete shape rotated
11.	**ans: 1808.64 cm²** **4 RE** • 1 identify radius • 2 square radius • 3 calculation • 4 correct answer	 • 1 $r = 12$ • 2 $A = 4 \times \pi \times 12^2$ • 3 $A = 4 \times \pi \times 144$ • 4 $A = 1808.64$ cm² (1809.56 cm²)

	Give 1 mark for each •	Illustration(s) for awarding each mark
12.	**(a) ans: 47.12 cm** **3 KU**	
	• 1 knowing to use circumference formula • 2 calculation • 3 correct answer	• 1 $C = \pi d$ • 2 $C = \pi \times 15$ • 3 $C = 47.12$ cm
	(b) ans: No – rope too short **5 RE**	
	• 1 changing metres to cm • 2 multiplying circumference • 3 adding bucket height • 4 subtraction • 5 correct answer and reason	• 1 3.8 m = 380 cm • 2 $7 \times 47.1 = 329.7$ cm • 3 $329.7 + 45 = 374.7$cm • 4 $380 - 374.7 = 5.3$cm • 5 No ..... the rope is $\approx$ 5.3cm short.
		KU - 25 **RE - 23** **TOTAL 48**