General Mathematics - Practice Examination F

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

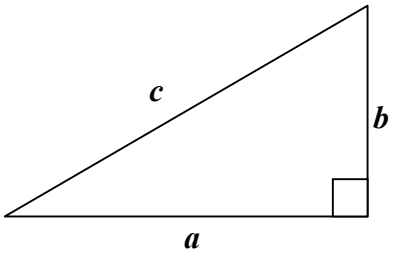
Read Carefully

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

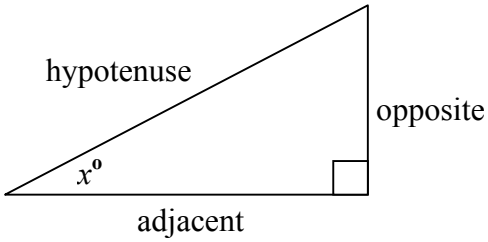
Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi r h$
Volume of a cylinder: $V = \pi r^2 h$
Volume of a triangular prism: $V = Ah$

Theorem of Pythagoras:



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

Trigonometrical ratios in a right angled triangle:

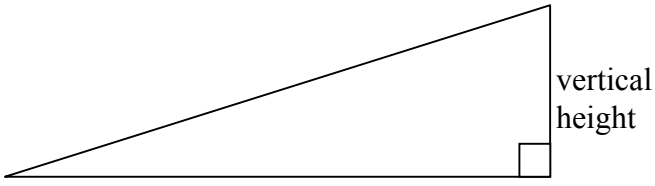


$$\tan x^o = \frac{\text{opposite}}{\text{adjacent}}$$

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

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

Gradient:



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

	KU	RE

1. Carry out the following calculations.

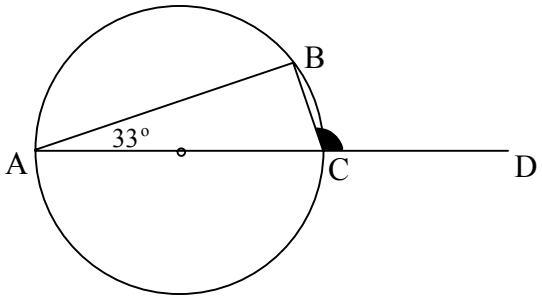
(*a*) $12\frac{1}{2}\%$ of £952 **(2)**

(*b*) 38·7 + 3·51 **(1)**

(*c*) 2·7 × 300 **(1)**

(*d*) 63 ÷ 0·9 **(1)**

2. Calculate the size of $\angle$BCD in the diagram below. **(3)**



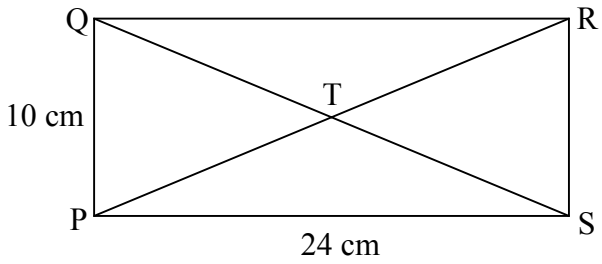
3. (*a*) Solve

$$6(x-2)-2(x-8)=0\,.$$ **(3)**

(*b*) Find the value of $2x^2+3x-\sqrt{x}$ when $x=9$. **(3)**

	KU	RE

4. PQRS is a rectangle with diagonals intersecting at T.



Calculate the length of ST. **(4)**

5. Calculate $(4 \cdot 1 \times 10^4) + (3 \cdot 7 \times 10^2)$ writing your answer as an ordinary number. **(2)**

6. (*a*) What is the smallest number that 3, 7, 12 and 14 will all divide into? **(1)**

(*b*) **Hence** write these fractions in order, starting from the smallest. **(2)**

$\frac{6}{7}$ $\frac{11}{12}$ $\frac{2}{3}$ $\frac{11}{14}$

	KU	RE

7. James puts his savings of £3400 into the bank, and receives interest at a rate of 4% per annum.

(*a*) How much money will James have in his account at the end of the first year? **(2)**

(*b*) James needs £3800 to buy a motorbike.
For how many years does he have to invest his money so that he will have enough saved up? **(3)**

8. A survey is carried out to find out how many children are in each family.
The results for one street are shown below.

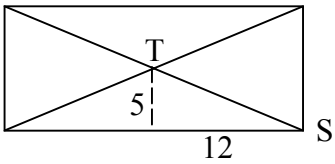
Number of children per family	0	1	2	3	4	5
Number of families	3	10	13	10	6	2

(*a*) Calculate the mean number of children per family. **(3)**

(*b*) What percentage of these families has more than two children? **(3)**

END OF QUESTION PAPER

General Mathematics Practice Exam F Marking Scheme - Paper 1

	Give 1 mark for each •	Illustrations for awarding each mark
1(a)	• knowing to work out $\frac{1}{8}$ (or otherwise) • carry out calculation correctly	• $\frac{1}{8}$ of £952 • £119
1(b)	• carry out calculation correctly	• 42·21
1(c)	• carry out calculation correctly	• 810
1(d)	• carry out calculation correctly	• 70 **5 marks KU**
2.	• know angle in semi-circle is right-angle • calculate 3rd angle in triangle • calculate required angle	• $\angle ABC = 90^o$ • $\angle ACB = 180 - (90 + 33) = 57^o$ • $\angle BCD = 180 - 57 = 123^o$ **3 marks RE**
3(a)	• multiply out of brackets correctly • gather like terms • solve for x	• $6x - 12 - 2x + 16 = 0$ • $4x = -4$ • $x = -1$ **3 marks KU**
3(b)	• substitute number into expression • evaluates square and square root correctly • answer	• $2(9^2) + 3(9) - \sqrt{9}$ • $2\times81 + 3\times9 - 3$ • 186 **3 marks KU**
4.	• divide up diagram to make right-angled triangle • knows to use Pythagoras' Theorem • uses Pythagoras correctly • answer	•  • $ST^2 = 5^2 + 12^2$ • ST = 13 cm **4 marks RE**
5.	• removes standard form correctly • answer	• 41000 + 370 • 41370 **2 marks KU**
6(a)	• answer	• 84 **1 mark KU**
6(b)	• puts fractions over common denominators • orders fractions from smallest to largest	• $\frac{72}{84}$ $\frac{77}{84}$ $\frac{56}{84}$ $\frac{66}{84}$ • $\frac{2}{3}$ $\frac{11}{14}$ $\frac{6}{7}$ $\frac{11}{12}$ **2 marks RE**

	Give 1 mark for each •	**Illustrations for awarding each mark**
7(a)	• knows how to calculate interest • adds interest on to amount invested	• 0·04 × 3400 = 136 (or otherwise) • £3536 **2 marks KU**
7(b)	• attempts to calculate interest for further years • calculates amounts correctly • correct conclusion	• 1·04 × 3536 = 3677·44 (or otherwise) 1·04 × 3677·44 = 3824·54 • as above • must invest for 3 years **3 marks RE**
8(a)	• attempting to find total no. of children • finding total no. of houses • answer	• 0×3 + 1×10 + 2×13 + 3×10 + 4×6 + 5×2 = 100 • 3 + 10 + 13 + 14 + 8 + 2 = 50 • 100 ÷ 50 = 2 **3 marks KU**
8(b)	• knowing to choose 3, 4 or 5 children in family • knows to divide total by 50 • answer	• 10 + 6 + 2 = 18 • 18 ÷ 50 • 36% **3 marks RE**

Total marks: KU 19 **RE** 15

General Mathematics - Practice Examination F

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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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3. Full credit will be given only where the solution contains appropriate working.
4. **You may use a calculator**

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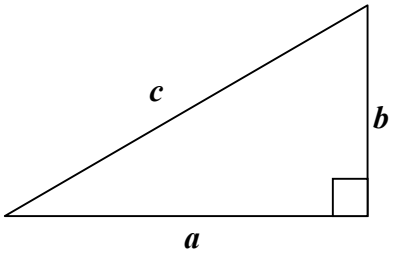

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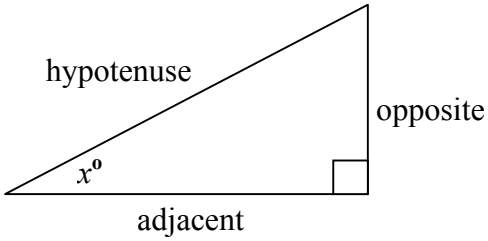

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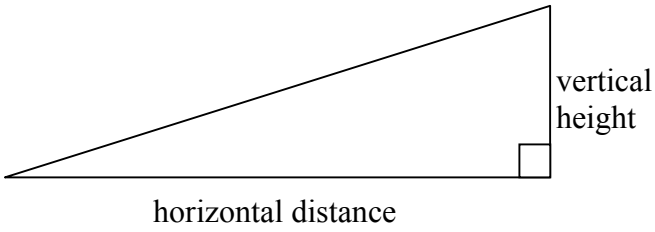
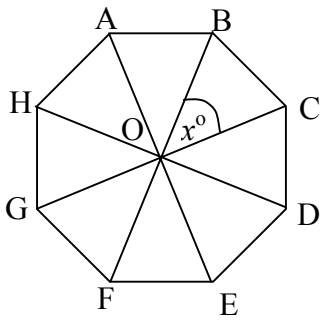


$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

	KU	RE

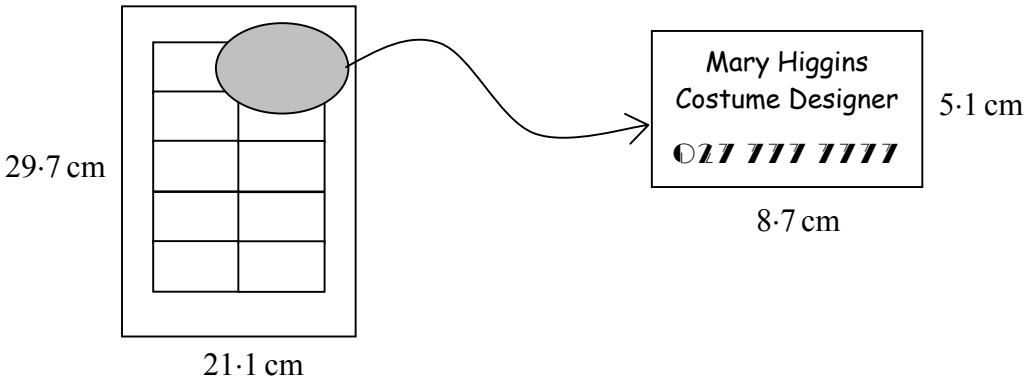
1. The shape ABCDEFGH is a regular octagon with diagonals crossing at O.



(*a*) Calculate *x*, the angle shown at the centre of the shape. **(2)**

(*b*) The octagon is rotated through 135°.
What are the two possible images of triangle BOC under this rotation? **(3)**

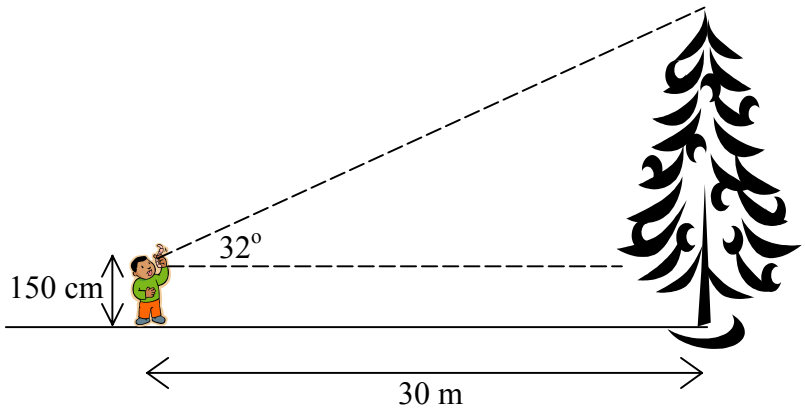
2. Mary's business cards are cut from an A4 page, as shown.



If **one thousand of these cards are printed**, calculate the total amount of waste paper accrued from making these cards. **(4)**

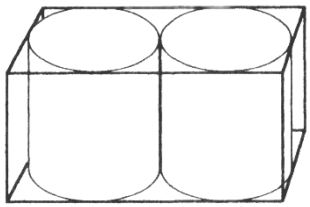
	KU	RE

3. Alan's dad told him that the tree at the bottom of his garden was **more** than 20 metres tall. Alan thinks it is less than 20 metres.



Alan measures the angle to the top of the tree with a clinometer.
Who is correct, Alan or his dad? **(Do not use a scale drawing).** **(4)**

4. Two cylinders, each of radius 9 cm and height 20 cm, fit exactly into a rectangular box.



(*a*) State the dimensions of the box. **(3)**

(*b*) Calculate the volume of empty space in the box. **(4)**

KU	RE

5. The Harris family are going on holiday to Florida.

They use the mileage chart shown to plan their journeys.

MILEAGE CHART	Clearwater	Cocoa Beach	Crystal River	Key Largo	Key West	Kissimmee	Miami	Naples	Orlando
Clearwater		143	60	314	410	70	275	165	106
Cocoa Beach	143		140	249	345	65	191	220	50
Crystal River	60	140		350	450	85	325	210	90
Key Largo	314	249	350		96	284	55	144	294
Key West	410	345	450	96		380	160	236	390
Kissimmee	70	65	85	284	380		215	176	20
Miami	275	191	325	55	160	215		107	232
Naples	165	220	210	144	236	176	107		269
Orlando	106	50	90	294	390	20	232	269	

(*a*) They hire a car in Key West and travel first to Miami, then on to Orlando and back to Key West.

Calculate the total distance travelled. **(2)**

(*b*) They hire the car for 7 days with *Easy Hire*.

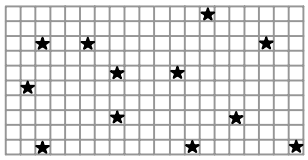
Easy Hire
Mileage allowance:
75 miles per day
For each additional mile:
$0·20

How much extra do they have to pay the car hire company? **(3)**

(*c*) The Harris' spend 15 hours 45 minutes travelling in the car, in total.
Calculate the average speed of the car, to 1 decimal place. **(2)**

	KU	RE

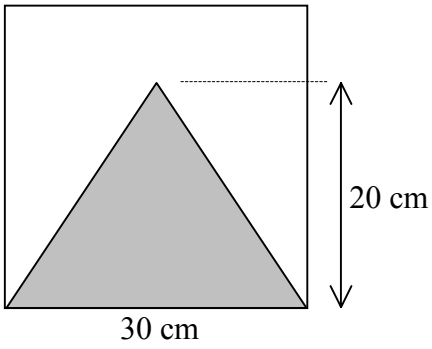
6. Lydia is making a prize-winning grid to raise money for charity.
The grid is a rectangle, 20 squares long by 10 squares broad.



There are 12 winning squares altogether.

What is the probability of picking a winning square? **(3)**

7. An isosceles triangle is cut from a square of length 30 cm, as shown.



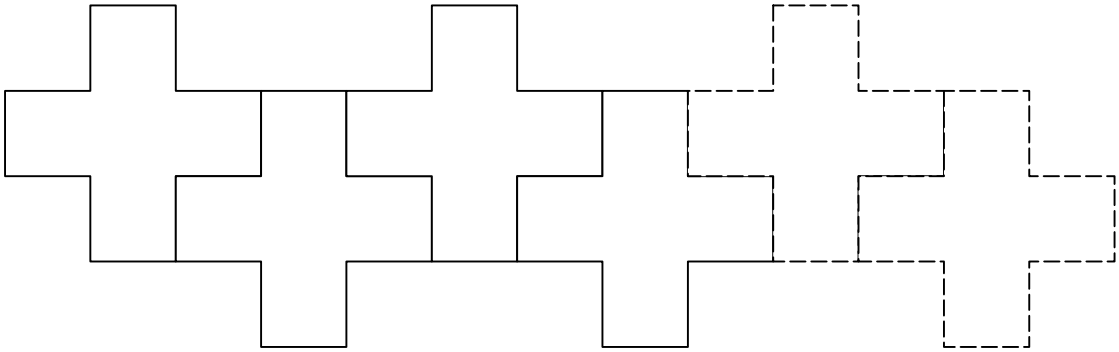
(*a*) Calculate the area of the isosceles triangle. **(2)**

(*b*) Calculate the percentage of the square left over after the triangle is cut away. **(3)**

KU RE

8. Caroline has designed some crazy paving for her garden path.
Each paving stone is in the shape of a cross.

Each cross is joined to the next on three sides, as shown below.



(*a*) Complete the table: **(2)**

No. of paving stones (p)	2	3	4	5		14
No. of edges joined (e)	3		9			

(*b*) Find a formula for calculating the number of edges joined (e), when you know the number of paving stones (p). **(2)**

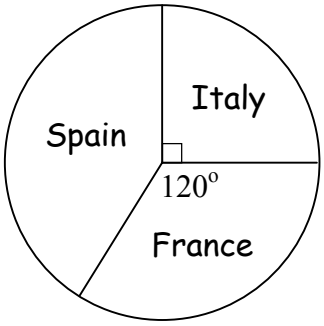
(*c*) Caroline completed the path with 117 edges joined altogether.
How many paving stones were used? **(2)**

9. Factorise

$18a - 27$ **(2)**

	KU	RE

10. 60 people were surveyed and asked for their favourite holiday destination.
The results are shown in the pie chart.



(*a*) How many people went to Italy on holiday? **(2)**

(*b*) How many more people went to Spain than Italy? **(3)**

END OF QUESTION PAPER

General Mathematics Practice Exam F Marking Scheme - Paper 2

	Give 1 mark for each •	Illustrations for awarding each mark
1(a)	• know to divide 360^o by 8 • answer	• $360 \div 8$ • 45^o **2 marks KU**
1(b)	• calculate no. of segments • rotates clockwise • rotates anti-clockwise	• $135 \div 45 = 3$ parts • triangle EOF • triangle HOG **3 marks KU**
2.	• calculates no. of pages • calculates area of business cards • calculates area of page • calculates waste paper for whole batch	• $1000 \div 10 = 100$ pages • $8{\cdot}7 \times 5{\cdot}1$ ($\times 10$) = $443{\cdot}7$ cm^2 • $21{\cdot}1 \times 29{\cdot}7 = 626{\cdot}67$ cm^2 • Waste = $(626{\cdot}67 - 443{\cdot}7) \times 100$ $= 18297$ cm^2 **4 marks RE**
3.	• uses correct trigonometric ratio • calculates opposite side correctly • calculates height of tree correctly • conclusion	• $\tan 32^o = \frac{h}{30}$ • h = 18·75 m • height = 18·75 + 1·5 = 20·25 m • Alan's dad is correct **4 marks RE**
4(a)	• calculates length • calculates breadth • calculates height	• $4 \times 9 = 36$ cm • $2 \times 9 = 18$ cm • 20 cm **3 marks KU**
4(b)	• calculates volume of box • calculates volume of cylinder • multiplies volume of cylinder by 2 • calculates space left in box	• $36 \times 18 \times 20 = 12960$ cm^3 • $\pi r^2 h = \pi \times 9^2 \times 20 = 5089 \cdot 38$ cm^3 • $5089{\cdot}38 \times 2 = 10178{\cdot}8$ cm^3 • Space = $12960 - 10178{\cdot}8 = 2781{\cdot}2$ cm^3 **4 marks RE**
5(a)	• finds distances from mileage chart • adds distances correctly	• Key West to Miami = 160 miles Miami to Orlando = 232 miles Orlando to Key West = 390 miles • Total = 782 miles **2 marks KU**
5(b)	• calculates total mileage allowed • calculates extra miles travelled • calculates cost	• $7 \times 75 = 525$ miles • $782 - 525 = 257$ miles • $257 \times 0{\cdot}20 = \$51{\cdot}40$ **3 marks RE**
5(c)	• uses correct formula • answer	• $S = \frac{D}{T} = \frac{782}{15 \cdot 75}$ • 49·7 mph **2 marks KU**

	Give 1 mark for each •	**Illustrations for awarding each mark**
6	• finding no. of squares on grid • knowing how to find probability • simplifying answer	• $20 \times 10 = 200$ • $\frac{12}{200}$ • $\frac{3}{50}$ or 0·06 **3 marks RE**
7(a)	• knows how to work out area of triangle • calculates area correctly	• Area = $\frac{1}{2} \times 30 \times 20$ • 300 cm^2 **2 marks KU**
7(b)	• calculates amount of waste • knows to divide by area of square • calculates %	• $900 - 300 = 600$ cm^2 • $\frac{600}{900}$ • $66\frac{2}{3}\%$ **3 marks RE**
8(a)	• entries 6 and 12 in table • entry 39 in table	• see table below • see table below **2 marks RE**
8(b)	• and • correct formula	• and • $e = 3p - 3$ **2 marks RE**
8(c)	• making equation • solving equation	• $3p - 3 = 117$ • $3p = 120$ $p = 40$ i.e. 40 paving stones used **2 marks RE**
9.	• common factor • bracket	• 9 • (2a – 3) **2 marks KU**
10(a)	• knowing to work out one quarter • answer	• $\frac{1}{4}$ of 60 • 15 people **2 marks KU**
10(b)	• calculate missing angle in pie chart • calculate fraction of pie chart • calculate no. of people	• $360 - (90 + 120) = 150^o$ • $\frac{150}{360}$ *or* $\frac{5}{12} \times 60 = 25$ people • 25 – 15 = 10 people more go to Spain **3 marks KU**

Question 8:

No. of paving stones (p)	2	3	4	5		14
No. of edges joined (e)	3	**6**	9	**12**		**39**

Total marks: KU 21 **RE** 27