General Mathematics - Practice Examination E

MATHEMATICS
Standard Grade - General Level

Paper I

Time Allowed - 35 minutes

First name and initials

Surname

Class

Teacher

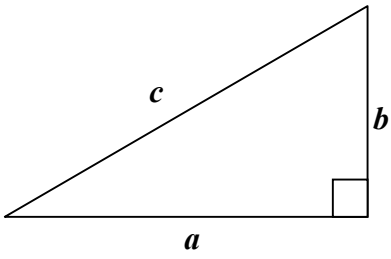
Read Carefully

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

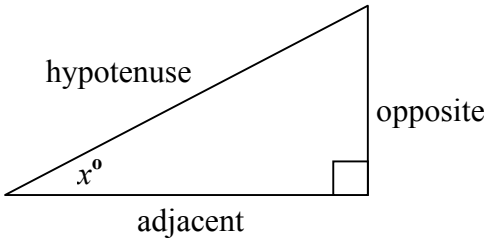
Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi r h$
Volume of a cylinder: $V = \pi r^2 h$
Volume of a triangular prism: $V = Ah$

Theorem of Pythagoras:



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

Trigonometrical ratios in a right angled triangle:

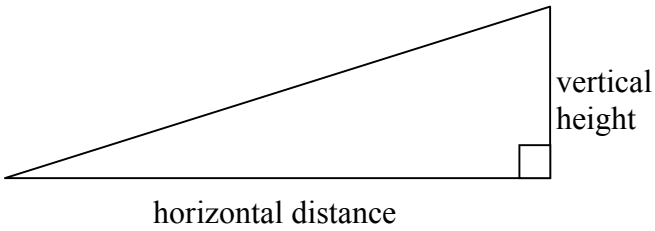


$$\tan x^o = \frac{\text{opposite}}{\text{adjacent}}$$

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

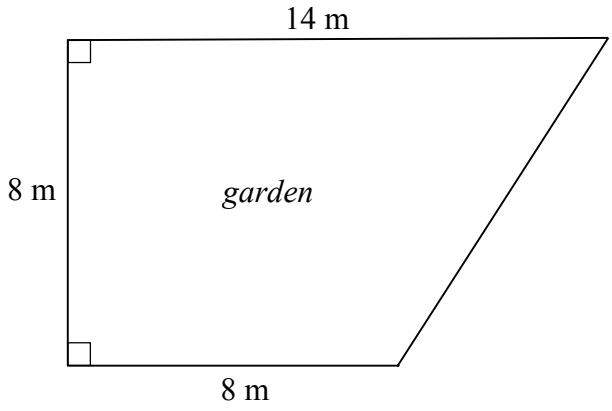
$$\cos x^o = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Gradient:



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

	KU	RE
1. Carry out the following calculations.		
(*a*) $66\frac{2}{3}\%$ of £4·20 **(2)**		
(*b*) $11 \cdot 4 - 5 \cdot 62$ **(1)**		
(*c*) $0 \cdot 83 \times 400$ **(1)**		
(*d*) $49 \cdot 56 \div 7$ **(1)**		
2. Calculate the perimeter of this garden. **(5)**		



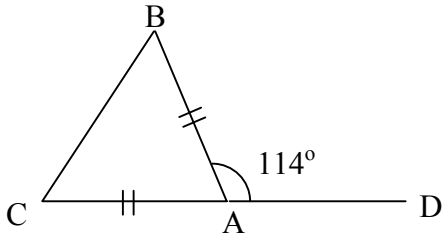
3. (*a*) Factorise $18a - 27b$ **(2)**		
(*b*) Solve **algebraically** the equation $3(2x + 1) = 4x$ **(3)**		

	KU	RE

4. In the diagram AB = AC and $\angle$BAD = 114° as shown.

(*a*) Find $\angle$CAB. **(2)**

(*b*) Find $\angle$ABC. **(2)**



5. (*a*) When John, a cyclist, had travelled a distance of 15 km he had completed $\frac{3}{7}$ of his journey.

What was the total length of his journey? **(2)**

(*b*) John travelled at an average speed of 10 km/h.

Calculate the time taken for the whole journey, giving your answer in hours and minutes. **(3)**

6. Sam's class held a competition to find out who could hold their breath the longest. The results, in seconds, are shown below:

34 56 82 65 44 61 78 32 45 52 51 63 49 47 39 56 25 43 47 41

(*a*) Construct a stem-and-leaf diagram to illustrate this data. **(3)**

(*b*) What is the median number of seconds for this data? **(2)**

	KU	RE
7. Two shops are selling the same model of computer for the same price. One shop asks for a £200 deposit and 12 equal payments of £100. The other shop asks for a £500 deposit and 10 equal payments. How much should each payment be? **(4)**		

END OF QUESTION PAPER

General Mathematics Practice Exam E Marking Scheme - Paper 1

	Give 1 mark for each •	Illustrations for awarding each mark
1(a)	• knowing to work out $\frac{2}{3}$ • carry out calculation correctly	• $\frac{2}{3}$ of £4·20 • £2·80
1(b)	• carry out calculation correctly	• 5·78
1(c)	• carry out calculation correctly	• 332
1(d)	• carry out calculation correctly	• 7·08 **5 marks KU**
2.	• know to use Pythagoras' Theorem to find sloping side (say x) • square and add numbers correctly • use Pythagoras correctly • know to add lengths • adding correctly	• $x^2 = 8^2 + 6^2$ • $x^2 = 64 + 36 = 100$ • $x = 10$ m • Perimeter = 14 + 8 + 8 + 10 • 40 m **5 marks RE**
3(a)	• correct common factor • correct bracket	• and • $9(2a - 3b)$ **2 marks KU**
3(b)	• expand bracket correctly • gather like terms correctly • solve equation	• $6x + 3 = 4x$ • $2x = -3$ • $x = -\frac{3}{2}$ *or* $-1 \cdot 5$ **3 marks KU**
4(a)	• know to subtract 114^o from 180^o • subtract correctly	• 180 – 114 • 66^o
4(b)	• know to subtract from 180^o • know to half above answer	• 180 – 66 = 114 • $114 \div 2 = 57^o$ **4 marks KU**
5(a)	• know to find $\frac{1}{7}$ by dividing by 3 • know to find whole journey by multiplying by 7	• 15 ÷ 3 = 5 km • 5 × 7 = 35 km **2 marks RE**
5(b)	• know to divide answer to (a) by speed • dividing correctly • writing answer in hours and minutes	• 35 ÷ 10 (or equivalent from (a)) • 3·5 hours • 3 hours 30 minutes **3 marks KU**

	Give 1 mark for each •	**Illustrations for awarding each mark**
6(a)	• correct stem and showing key • correct leaves • putting leaves in correct order	• • and • see below for diagram **3 marks KU**
6(b)	• finding 10^{th} and 11^{th} pieces of data (must be shown) • averaging the above two numbers	• finding 47 and 49 • (47 + 49) ÷ 2 = 48 **2 marks KU**
7.	• know to work out total cost of computer • working out total cost correctly • know to subtract £500 from total cost • divides remainder by 10	• 200 + (12 × 100) • £1400 • 1400 – 500 = £900 • 900 ÷ 10 = £90 **4 marks RE**

Diagram for Question 6(a)

2	5
3	2 4 9
4	1 3 4 5 7 7 9
5	1 2 6 6
6	1 3 5
7	8
8	2

6 / 3 means 63 seconds

General Mathematics - Practice Examination E

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 this paper.

MATHEMATICS

Standard Grade - General Level

Paper II

Time Allowed - 55 minutes

First name and initials

Surname

Class

Teacher

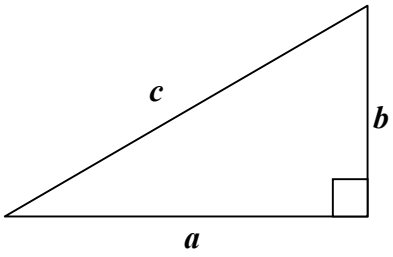
Read Carefully

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 use a calculator**

FORMULAE LIST

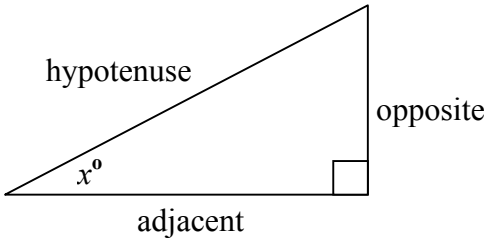
Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi r h$
Volume of a cylinder: $V = \pi r^2 h$
Volume of a triangular prism: $V = Ah$

Theorem of Pythagoras:



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

Trigonometrical ratios in a right angled triangle:

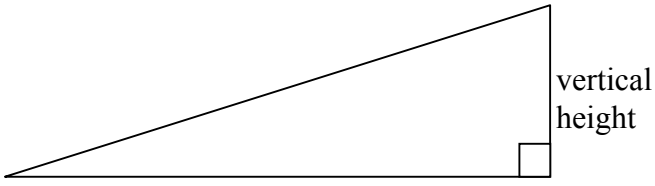


$$\tan x^o = \frac{\text{opposite}}{\text{adjacent}}$$

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

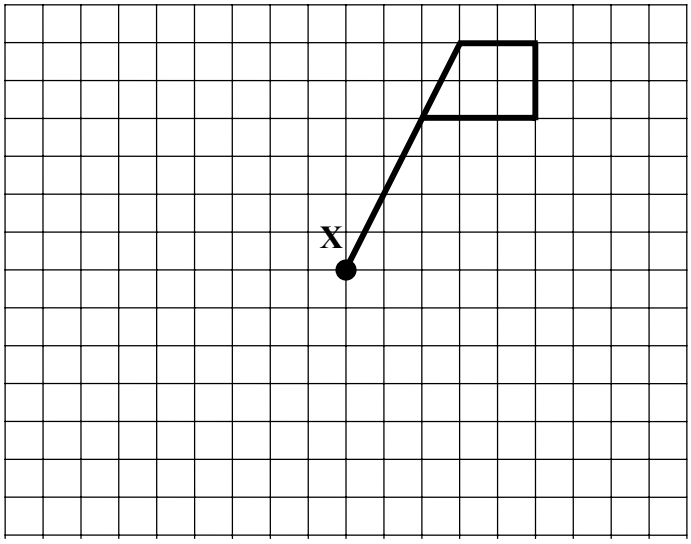
$$\cos x^o = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Gradient:



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

	KU	RE
1. Complete the pattern below so that it has rotational symmetry of order 4 about point **X**: **(3)**		



---

2. Erin has annual tax free allowances of £3500.

Erin pays income tax at the rate of 24% on the first £13 800 of taxable income and at the rate of 46% on the remainder.

(*a*) Calculate the amount of income tax paid on the first £13 800 of taxable income. **(2)**

(*b*) Calculate Erin's gross income if she pays in total £6233 in income tax **(5)**

	KU	RE

3. In a class there are 16 boys and 13 girls.
Four boys wear glasses and three girls wear glasses.

A pupil is picked at random from the class.

(*a*) What is the probability that the pupil is a boy? **(2)**

(*b*) What is the probability that the pupil wears glasses? **(2)**

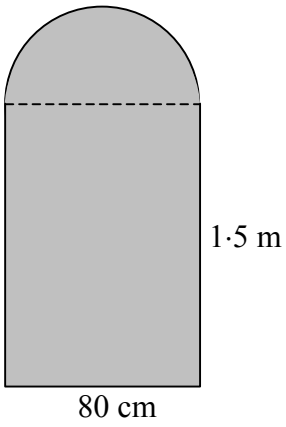
(*c*) What is the probability that the pupil is a boy who wears glasses? **(1)**

(*d*) A girl is picked at random from the class.

What is the probability that she wears glasses? **(1)**

4.

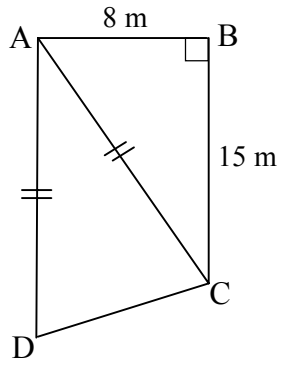
A window is in the shape of a rectangle and a semicircle , as shown. The rectangular part of the window is 80 cm long and 1·5 m high.



Calculate the area of the window in cm^2. **(5)**

	KU	RE

5. Nayeem's horses' field can be split into a right-angled triangle and an isosceles triangle as shown in the diagram.



(*a*) AB = 8 m and BC = 15 m.
Show that AC is 17 metres long. **(3)**

(*b*) Calculate the size of angle ACB, to the nearest degree. **(3)**

(*c*) Given that AD is parallel to BC, state the size of angle DAC. **(1)**

(*d*) Hence calculate the length of DC correct to 1 decimal place. **(5)**

---

6. Anna was on holiday in Austria.

On a day trip to Italy, Anna noticed that she could pay for her lunch in either Austrian Schillings (ATS) or Italian Lire.

£1 = 21 ATS
£1 = 3100 Lire

Anna's bill was either 9000 Lire **or** 78 ATS.

Using the exchange rates shown, which currency gives Anna the best value for her money, and how much would she save by taking this option? **(3)**

KU	RE

7. George went paragliding.

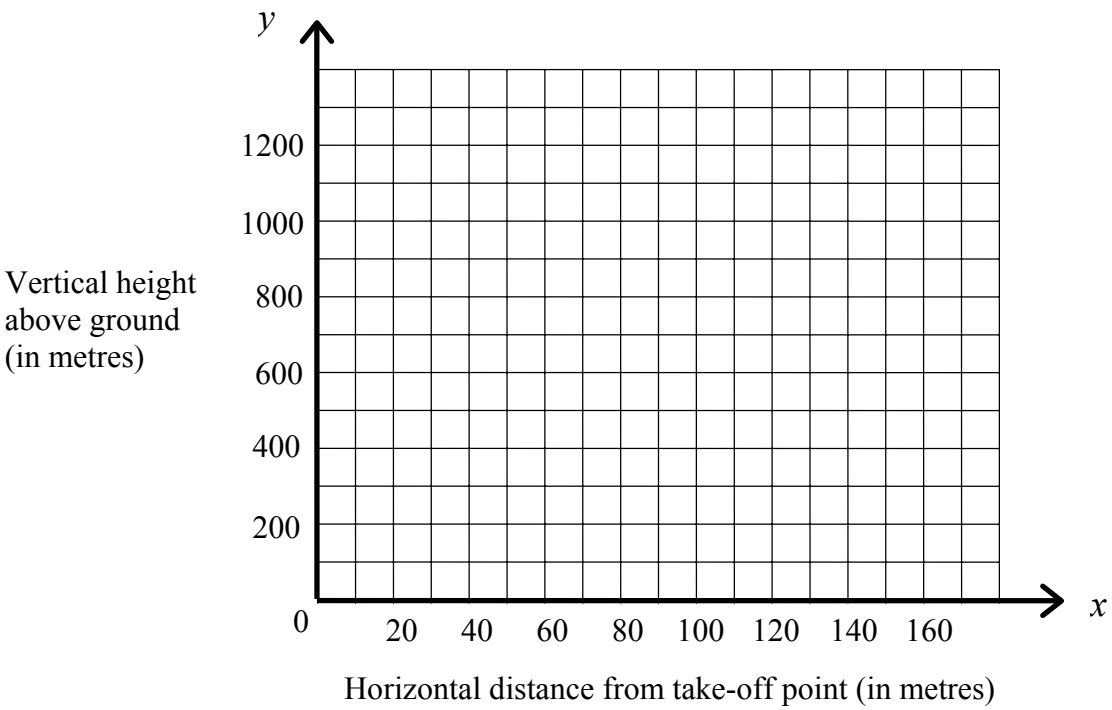
For the last part of his flight he glided in a perfect straight line until he landed.

The equation of this straight line is $y = 1400 - 10x$.

(*a*) Complete the table below for $y = 1400 - 10x$. **(2)**

Distance from take-off point (x)	20	40	60	80
Height (y)				

(*b*) Using the table in (*a*) draw the graph of the line $y = 1400 - 10x$ on the grid below. **(2)**



(*c*) Write down the coordinates of the point where George landed. **(2)**

KU RE

8. Elizabeth was on holiday in the Dolomites.

One of the roads where she was staying had lots of hair-pin bends.
She noticed that the height of the road,above sea level, at each successive bend followed a pattern. The pattern is shown in the table below.

(All heights are in metres above sea level)

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

No. of hair-pin bend (n)	1	2	3	4	5		10
Height above sea level (h)	1820	1832	1844				

(*b*) Find a formula connecting the number of the hair-pin bend and its height above sea level. **(2)**

(*c*) Elizabeth thought she saw a sign for a hair-pin bend with a height of 2000 m.

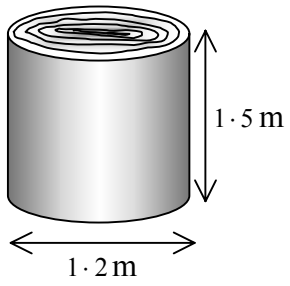
Was she correct? *All working must be shown*. **(3)**

(*d*) There are 28 hair-pin bends in total.

Calculate the height of this last bend above sea level. **(2)**

	KU	RE

9. Michael is rolling hay into the shape of a cylinder with diameter $1 \cdot 2$ m and height $1 \cdot 5$ m, as shown in the diagram.



(*a*) Calculate the volume of this cylinder, in m^3, correct to 2 decimal places. **(3)**

(*b*) The cylinder of hay is then wrapped in thin plastic sheeting.

Given that all the surfaces of the cylinder are covered, calculate the total surface area of the wrapping in square metres. **(4)**

(*c*) Jason makes bales of the same volume but makes them into the shape of a cuboid instead.

If the length and breadth of the cuboid are $1 \cdot 5$ m and $0 \cdot 9$ m respectively, Calculate the height of the cuboid. **(3)**

---

10. Anton has a 4-digit security code for his mobile phone.

The first digit is a 4 and the rest are prime numbers **less than 7**.

All of the digits are different.

List all six possible security codes for Anton's phone. **(3)**

1st	2nd	3rd	4th

END OF QUESTION PAPER

General Mathematics Practice Exam E Marking Scheme - Paper 2

	Give 1 mark for each •	Illustrations for awarding each mark
1.	• knows how to rotate through 180^o • knows how to rotate through 45^o • completed diagram	• see completed diagram at end of marking scheme **no marks to be given for reflecting diagram** **3 marks RE**
2(a)	• knows how to find 24%	• $\frac{24}{100} \times 13800$
	• finding percentage correctly	• £3312 **2 marks KU**
2(b)	• know to subtract £3312 from £6233 • know to divide by 46% to find remainder of taxable income	• 6233 – 3312 = £2921 • 2921 ÷ 0·46 (or equivalent)
	• dividing correctly • know to add $\bullet_1$ and $\bullet_3$ onto tax free allowance • adding correctly	• £6350 • £3500 + £13800 + £6350 • £23650 **5 marks RE**
3(a)	• know to calculate total no. of pupils • calculates probability	• 16 + 13 = 29 • $\frac{16}{29}$ **2 marks KU**
3(b)	• know to calculate total no. who wear glasses • calculates probability	• 4 + 3 = 7 • $\frac{7}{29}$ **2 marks KU**
3(c)	• calculates probability	• $\frac{4}{29}$ **1 mark KU**
3(d)	• calculates probability	• $\frac{3}{13}$ **1 mark KU**
4.	• know to change 1·5 metres into cm • finding area of rectangle • knows how to find area of semi-circle • findind area correctly • adding two areas together	• 1·5 m = 150 cm • Area = $150 \times 80 = 12\,000$ cm^2 • $0{\cdot}5 \times \pi \times 40^2$ • 2512cm^2 (if $\pi = 3{\cdot}14$) • 14512 cm^2 **5 marks KU**
5(a)	• know to use Pythagoras' Theorem • square and add numbers correctly • show that AC = 17 by taking square root.	• $AC^2 = 15^2 + 8^2$ • $= 225 + 64 = 289$ • AC = 17 m **3 marks KU**
5(b)	• know to use trigonometry • use trig. ratio correctly • finds correct angle	• tan = ... • tan ACB = $\frac{8}{15}$ • ACB = 28^o **3 marks KU**

	Give 1 mark for each •	**Illustrations for awarding each mark**
5(c)	• correct angle stated	• angle DAC = 28^o (alternate angles) **1 mark KU**
5(d)	• know to half angle of 28^o as triangle is isosceles and create 2 congruent right-angled triangles • and • uses trigonometry correctly • calculates x i.e. half of DC • finds length of DC	• $28 \div 2 = 14^o$ • and • $\sin 14^o = {}^{x}\!/_{17}$ • $x = 4{\cdot}11$ m • DC = 8·22 m **5 marks RE**
6.	• knows to divide by exchange rate • converts prices to £ correctly • draws correct conclusion	• $9000 \div 3100$ and $78 \div 21$ • £2·90 and £3·71 • It is cheaper for Anna to pay in **Lire**, by 81p. **3 marks RE**
7(a)	• two coordinates correct • another two coordinates correct	• • (20, 1200), (40, 1000), (60, 800) (80, 600) **2 marks KU**
7(b)	• straight line with correct x-intercept • straight line with correct y-intercept	• straight line cutting x-axis at 140 • straight line cutting y-axis at 1400 **2 marks KU**
7(c)	• know that ground level is when $y = 0$ • correct coordinates	• writes down coordinate where $y = 0$ • (140, 0) or alternative depending on pupil's own line. **2 marks RE**
8(a)	• two correct entries in table • third entry correct	• and • (4, 1856), (5, 1868), (10, 1928) **2 marks RE**
8(b)	• and • correct formula	• and • $h = 12n + 1808$ or equivalent **2 marks RE**
8(c)	• put formula = 2000 • solve equation • correct conclusion	• $12n + 1808 = 2000$ • $n = 16$ • yes, she was correct as answer is a whole number. **3 marks RE**
8(d)	• know to put $n = 28$ in formula • correct height	• $h = (12 \times 28) + 1808$ • $h = 2144$ m **2 marks RE**
9(a)	• knows how to calculate volume • substitutes correct value for r • correct calculations (ignore rounding – only for guidance)	• $V = \pi r^2 h$ • $= \pi \times 0 \cdot 6^2 \times 1 \cdot 5$ • $= 1 \cdot 70\,\text{m}^3$ **3 marks KU**

	Give 1 mark for each •	Illustrations for awarding each mark
9(b)	• knows to find surface area • calculates curved surface area correctly • calcuates area of 2 circular ends (i.e. top and bottom) • adds areas together	• attempts working • $\pi \times 1 \cdot 2 \times 1 \cdot 5 = 5 \cdot 65\,\text{m}^2$ • $\pi \times 0 \cdot 6^2 \times 2 = 2 \cdot 26\,\text{m}^2$ • Surface area = $7 \cdot 91\,\text{m}^2$ **4 marks RE**
9(c)	• knows volume of cuboid = $1 \cdot 70\,\text{m}^3$ • knows to divide volume by (length × breadth) • calculates height correctly	• $1 \cdot 70 = l \times b \times h$ • $h = \dfrac{1 \cdot 70}{1 \cdot 5 \times 0 \cdot 9}$ • $1 \cdot 26\,\text{m}$ **3 marks RE**
10.	• 2 or 3 correct combinations • 4 or 5 correct combinations • all 6 correct combinations	• 4 2 3 5 4 2 5 3 4 3 2 5 4 3 5 2 4 5 2 3 4 5 3 2 **3 marks RE**

Total for Papers I and II : KU 49 RE 48

Diagram for Question 1