# General Mathematics - Practice Examination A 

 Please note ... the format of this practice examination is different from the current format. The paper timings are different and calculators can be used throughout.
## MATHEMATICS <br> Standard Grade - General Level

Time allowed - 1 hours 30 minutes
First name and initials
Surname
$\square$
$\square$

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

Theorem of Pythagoras:


$$
\boldsymbol{a}^{2}=\boldsymbol{b}^{2}+\boldsymbol{c}^{2}
$$

Trigonometrical ratios in a right angled triangle:


Gradient:


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

$$
\begin{equation*}
3 x+2=18-x \tag{3}
\end{equation*}
$$

2. The radius of the earth is $4.8 \times 10^{6}$ metres.

Write this number out in full.
3. John has a $£ 1$ coin which he is going to spend in the "snacks" machine. The cost of the items are as follows :

| Crisps | 25 p |
| ---: | ---: |
| Chump Bar | 10 p |
| Orange Drink | 35 p |

The machine is not giving any change. Complete the table to show four more ways for John to spend exactly $£ 1$.

4. The managers of the "Eskimo Engineering" company are experimenting with new logos. They decide to use the initial letters of the company name.


They want the design to have half-turn symmetry about the dot so that it can be used either way up.

Complete the design.

1. Solve the following equation
3) 

|  |
| :--- | $\square$

$\square$

(2)

5. Simplify $3(4 x+3)-7 x$
(3)
6. AB is a diameter of the circle and BD is a tangent at point B . Angle $\mathrm{BAD}=27^{\circ}$.


Calculate the size of the of the angle marked $x^{\circ}$.
(3)
7. (a) The cost per hour of making different types of television programmes is shown below :

| Type of programme | Cost (£) |
| :--- | ---: |
| Drama | 656000 |
| Sitcoms | 312000 |
| Family entertainment | 245000 |
| Documentary | 145000 |
| Chat show | 143000 |
| Sport | 51000 |
| Current affairs | 44000 |

What is the mean cost per hour of producing a television programme?
(2)
(b) This year 227760 hours of television will be broadcast. If you sat down to watch this continuously, how long would it take ?
Give your answer in years.
(2)
8. Gerry won $£ 1500$ in the National Lottery and decided to open a Building Society account. He invested his money in an account which offered a rate of $7 \%$ per annum.

How much money will he have if he closes his account at the end of 6 months?
(3)
9. A helicopter takes off and follows a path given by $y=3+2 x$. At the same time a hanglider is descending and is following a path given by $x+y=12$.

(a) Draw a graph to show these two flight paths and write down the coordinates of the point of intersection of the paths.

(b) Although the flight paths intersect, the helicopter and the hanglider do not meet. Give a reason for this.
10. At a garage the cost $£ C$, of car repairs is given by the formula

$$
C=30+p+18 t
$$

where $p$ is the cost in $£$ of new parts and $t$ is the time spent in hours on repairs.
(a) Find the total cost of repairs if new parts cost $£ 27$ and the repairs take 2 hours.
(b) If new parts cost $£ 58$ and the total cost is $£ 97$, how long was spent on repairs?
11. A jeweller makes earrings in the shape of similar triangles as shown below.


If the ratio of the sides is $6: 4$ and the area of the small triangle is $2.16 \mathrm{~cm}^{2}$, find the area of the largest triangle.
12. Tony has made a small coffee table in his woodwork class, by cutting the corners off a 70 cm square piece of wood .

The top of the table is shown.
He wants to complete the table by putting A finishing strip round the outside edge.

What length of strip will he need ?
Give your answer correct to $\mathbf{1}$ - decimal place.

13. Karen is buying a new TV \& video. She has seen it advertised in two stores in the town for a cash price of $£ 750$. Both stores offer payment terms.


Which firm is cheaper and by how much?
(7)
14. Mr and Mrs Redwood have a tree in their garden which they want to cut down. They are wondering if there is any chance it could hit the house as it falls.
They don't know the height of the tree.


Can the tree be cut down safely?

The angle of elevation of the top of the tree from the house is $39^{\circ}$ and the distance along the ground between the tree and the house is 10 m .
15.


The cost of a mirror ( $£ C$ ) varies directly as the square of its length $(s \mathrm{~cm})$.
A mirror of length 50 cm costs $£ 35$.
(a) Find a formula connecting $C$ and $s$.
(b) Find the cost of a mirror of length 30 cm .
16. Coronet Wallcoverings make several designs for wallpaper borders one of which is shown below. The pattern is made up of circle shapes and cross shapes.

(a) Complete the table below.

| Number of circle shapes (C) | 2 | 3 | 4 | 5 | 6 | 7 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Number of cross shapes (N) | 2 |  | 6 |  |  |  |

(b) Write down a formula connecting the number of cross shapes, $N$, and the number of circle shapes, $C$.

$$
N=
$$

(c) How many cross shapes would there be if there were 12 circle shapes ?
(d) How many circle shapes would there be in a pattern which had 36 cross shapes?
(e) Each pattern in the design is 40 cm long. A roll of the border is 10 m long. How many cross shapes would there be in a full roll of the border?
17. Mr. D. Glazing, a salesman, has to drive from London to Manchester - a distance of 200 miles - to attend a meeting at midday.
If he leaves the house at 9.15 am and travels by motorway, can he get to the meeting in time without breaking the speed limit?


## General Mathematics - Practice Exam A

Marking Scheme
1.

$$
\begin{array}{rlrl} 
& & 3 x+2 & =18-x \\
\text { For } & 3 x+x & =18-2 \\
\text { For } & 4 x & =16 \\
\text { For } & x & =4
\end{array}
$$

[ 3 marks KU ]
2. $4.6 \times 106=4800000$
(1)
[ 2 marks KU ]
3.

| Crisps | Chump | Drink |
| :---: | :---: | :---: |
| $\mathbf{1}$ | $\mathbf{4}$ | $\mathbf{1}$ |
| 2 | 5 | 0 |
| 4 | 0 | 0 |
| 0 | 10 | 0 |
| 0 | 3 | 2 |

(1) each row
[ 4 marks RA ]
4.

(2) each shape
[ 4 marks RA]
5.

$$
\begin{align*}
& 3(4 x+3)-7 x \\
& =12 x  \tag{1}\\
& \quad+9-7 x  \tag{1}\\
& =5 x+9 \tag{1}
\end{align*}
$$

6. 

> For $\angle \mathrm{ABD}=90^{\circ} \quad$ (tangent)
> For $\angle \mathrm{ADB}=180^{\circ}-(90+27)^{\circ}=63^{\circ}$

For $\quad \angle x=180^{\circ}-63^{\circ}=117^{\circ}$
[ 3 marks KU ]
7. (a) For mean $=\frac{1596000}{7}$

$$
\begin{equation*}
=228000 \tag{1}
\end{equation*}
$$

(b) For dividing by 24 i.e. $227760 \div 24=9490$

For dividing by $365 \quad 9490 \div 365=26$ years
(1) [2 marks RA ]
8. $\quad \begin{aligned} \text { For calculating } 1 \text { years interest } & =£ 105 \\ \text { For calculating } 6 \text { months interest } & =£ 105 \div 2 \\ & =£ 52.50 \\ & =£ 1500+£ 52.50 \\ \text { For calculating total } & =£ 1552.50\end{aligned}$
[ 3 marks KU ]
9. (a)


For point of intersection $=(3,9)$
(b) For suggesting - different speeds, times, planes, or other suitable reason
(1) [ 1 mark RA]
10. (a) For substituting into formula $C=30+27+(18 \times 2)$ $\qquad$
For answer
$=£ 93$
(1)
.(1) [2 marks KU ]
(b) For $97=30+58+18 t$

For $\quad 18 t=9$
For $\quad t=1 / 2 \mathrm{hr}$
(1) [3 marks RA]
11.

$$
\begin{align*}
& \text { For } \quad k=6 / 4=1.5  \tag{1}\\
& \text { For } \quad k^{2}=1 \cdot 5^{2}=2 \cdot 25  \tag{1}\\
& \text { For } \quad \text { Area }=2.25 \times 2.16 \\
& =4.86 \mathrm{~cm}^{2} \\
& \text { For } \quad \text { Area }=2.25 \times 2.16 \\
& =4.86 \mathrm{~cm}^{2}
\end{align*}
$$

(1)
(1)
[ 4 marks KU ]
12.


For diagram
For using Pythagoras
$x^{2}=10^{2}+10^{2}$
$=200$
$x=14.14$

$$
\begin{aligned}
\text { Perimeter } & =(4 \times 14.14)+(4 \times 50) \\
& =256.56 \mathrm{~cm}
\end{aligned}
$$

.(1) [5 marks RA]
13. Electro- city
Deposit $=10 \%$ of $£ 750=£ 75$
Payments $=12 \times £ 58=£ 696$
Total $=£ 75+£ 696=£ 771$
TownTV
Deposit $=£ 50$
Payments $=18 \times £ 40=£ 720$
Total $=£ 50+£ 720=£ 770$
TownTV cheaper by $£ 1$
(2)
[ 7 marks KU ]
14.


$$
\begin{align*}
\tan 39^{\circ} & =\frac{h}{10}  \tag{1}\\
h & =10 \tan 39^{\circ}  \tag{1}\\
& =8.1 \tag{1}
\end{align*}
$$

Yes it can be cut safely, since $8.1<10$
[4 marks RA]
15.

$$
\begin{align*}
& \text { (a) For } C \propto s^{2} \\
& \text { or } \quad C=k s^{2}  \tag{1}\\
& 35=2500 k  \tag{1}\\
& k=0.014 \\
& \mathrm{C}=0.014 s^{2} \tag{1}
\end{align*}
$$

.......... (1)
(b)

$$
\begin{align*}
C & =0.014 s^{2} \\
& =0.014 \times 900 \\
& =£ 12.60 \tag{1}
\end{align*}
$$

(1)
16. (a)

| $C$ | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $N$ | 2 | $\mathbf{4}$ | 6 | $\mathbf{8}$ | $\mathbf{1 0}$ | $\mathbf{1 2}$ |

(b) $\quad N=2 \mathrm{C}-2$
(c) $\quad N=(2 \times 12)-2$

$$
\begin{equation*}
=22 \tag{1}
\end{equation*}
$$

(d) $36=2 C-2$
$38=2 C$
$C=19$
(e) $10 \mathrm{~m}=1000 \mathrm{~cm}$

No of patterns $=\frac{1000}{40}=25$
(1)

No of crosses $=25 \times 2$
(1)

$$
\begin{equation*}
=50 \tag{1}
\end{equation*}
$$

17. Time from $9.15-1200=2 \mathrm{~h} 45 \mathrm{~m}$

$$
\begin{equation*}
S=\frac{\mathrm{D}}{\mathrm{~T}}=\frac{200}{2.75}=72 \cdot 7 \tag{1}
\end{equation*}
$$

No. He will break the limit $\qquad$ [ 4 marks RA]
(pupils may work out journey time for 70 mph etc.)

Totals |  | KU |
| :---: | :---: |
|  | RA |
|  | 40 |

