| DO NOT WRITE ON THIS PAPER | TIME - 2 hours | Paper 5 of 5 from ZigZag Education |
| :---: | :---: | :---: |
| Sample GCSE Examination Paper <br> Intermediate tier non-calculator paper | Standard Equipment: pen, pencil, ruler, protractor, compasses. |  |

1. Here is a sketch of a triangle ABC .
a) Construct a full scale, accurate drawing of the triangle.
b) Measure the size of angle $y$.
2. Calculate the mean of $2,4,5$, and 5 .
3. Which of these pairs of shapes are mathematically similar?
(a)

Squares

(b)

Triangles

(c)

(d) $\square$ Rectangles

4. Jack and Jill each carry one bucket up a hill to fetch water. Each bucket holds 1 litre. On the way down they both carry one bucket. Jack starts by carrying a full bucket but on the way down Jack falls down, spilling a quarter of his water. Jill starts by carrying a full bucket but on the way down Jill falls down, spilling a third of her water.
a) Write as a fraction how much water is being carried after the fall by-
i) Jack
ii) Jill
b) How much water in total are Jack and Jill carrying?
5. Construct an accurate 2D projection of the shape shown below, with a plan and both front and side elevations.
6. Find the next two terms in the number sequences below.
a) $14,9,4,-1,-6, \ldots \ldots$
b) $\quad 16,8,4,2,1, \ldots \ldots$
c) $1,2,3,5,8,13, \ldots \ldots$

7. The diagram below shows a mathematical rule

a) What is the output, when the input is 7 ?
b) What is the input, when the output is 23 ?
c) What is the output, when the input is $n$ ?
8. a) Write down the list of factors of 24 .
b) From this list, state-
i) Two factors which add to make 12.
ii) Two factors whose product is 72 .
9. Fill in the table below for the equation $y=3 x-7$

5 marks

| $x$ | 1 | 2 | 3 | 4 | 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $y=3 x-7$ |  |  |  |  |  |

10. The chart shows the car make of 100 Volkswagen (VW) car owners.

Complete the table and complete the pie chart.
Make it clear which area represents which car make.

| VW Car | Frequency | Angle |
| :---: | :---: | :---: |
| Golf | 50 |  |
| Polo | 10 |  |
| Passat | 40 |  |

11. Calculate
a)
$(-7)^{2}+1$
ii)
b) Write $2 / 11$ as a recurring decimal.

c) i) Evaluate $0.001234 \div 2$ and write your answer in standard form.
ii) Calculate $1.8 \times 10^{8}$ and write your answer in standard form

7 marks
12. a) A car would normally cost $£ \boldsymbol{x}$.

The salesperson offers a $20 \%$ discount for customers paying by cash.
How much in terms of $\boldsymbol{x}$ is the car after the cash discount?
Write down a formulae to represent the $\mathrm{n}^{\text {th }}$ term of sequences i) and ii).
b)
i)
$5,10,15,20, \ldots$
ii) $2 / 3,3 / 4,4 / 5,5 / 6, \ldots$
4 marks
13. The following heights were recorded during an experiment concerning plant growth.


| Height in cm | Frequency |
| :---: | :---: |
| $10<\mathrm{h} \leq 20$ | 1 |
| $20<\mathrm{h} \leq 30$ | 5 |
| $30<\mathrm{h} \leq 40$ | 8 |
| $40<\mathrm{h} \leq 60$ | 4 |
| $60<\mathrm{h} \leq 80$ | 12 |


a) Copy and complete the cumulative frequency table below and draw the cumulative frequency diagram.

| Height in cm | Cumulative Frequency |
| :---: | :---: |
| $\mathrm{h} \leq 10$ |  |
| $\mathrm{~h} \leq 20$ |  |
| $\mathrm{~h} \leq 30$ |  |
| $\mathrm{~h} \leq 40$ |  |
| $\mathrm{~h} \leq 60$ |  |
| $\mathrm{~h} \leq 80$ |  |

b) Estimate the median from your graph.
14. a) Write down a formula that must be true linking angle $\mathbf{A}$ with angle $\mathbf{B}$.
b) Work out the missing lengths $\boldsymbol{x}$ and $\mathbf{y}$. accurately

15. The following was produced by the function, $\mathbf{a} n^{2}+\mathbf{b}$, with $\mathbf{a}$ and $\mathbf{b}$ both as constants.

Find $\mathbf{a}$ and $\mathbf{b}$.
4 marks

| Input, $n$ | Output, $\mathbf{a} n^{2}+\mathbf{b}$ |
| :---: | :---: |
| 0 | 10 |
| 1 | 12 |
| 2 | 18 |
| 3 | 28 |
| 4 | 42 |

16. a) Jane thinks of a number adds 4 and then doubles her result.
i) If Jane ends up with 100 what did she start with?
ii) If Jane ends up with $\mathbf{y}$ what did she start with?

Tom ends up with a number twice as big as the number Jane ended up with, in part ii).
iii) Write down a formulae in $\mathbf{y}$ for the number Tom ended up with. 3 marks
17. a) Solve the simultaneous equations

$$
\begin{aligned}
& 2 x+3 y=30 \\
& -3 x+5 y=69
\end{aligned}
$$

b) In graphical terms, what does the solution to the simultaneous equations represent.

6 Marks
18. The areas of these two shapes are the same.

a) Formulate an equation in $x$, and solve the equation.

$(x+3) \mathrm{cm}$
b) Write down the area of the square.
19. a) Reflect the triangle ABC in the line $\mathrm{y}=x$ and label your new triangle $\mathrm{A}^{\prime} \mathrm{B}^{\prime} \mathrm{C}^{\prime}$.
b) Rotate the original triangle ABC , about the origin, $90^{\circ}$ clockwise. Label your new triangle $\mathrm{A}^{\prime \prime} \mathrm{B}^{\prime \prime} \mathrm{C}^{\prime \prime}$
c) Enlarge the original triangle ABC by a scale factor 2 , using $(2,3)$ as the centre of enlargement. Label your new triangle $\mathrm{A}^{\prime \prime} \mathrm{B}^{\prime \prime \prime} \mathrm{C}^{\prime \prime}$.
$\mathrm{y} \quad 5$ marks

20. a) Rewrite the scale in the form 1:n

The boat Floaty is on a bearing $250^{\circ}$ from Firey Point.
The boat Floaty is on a bearing $030^{\circ}$ from Kilren.
b) Mark accurately on the map the position of Floaty.

An old ship sank between Kilren and Firey Point.
The ship sank within 25 km of Firey Point and within 40 km of Kilren.
c) Shade the area where the ship might be.


