## Question

(a) Some students were measuring the height of a flagpole near the school. They had a measuring tape and a clinometer.


The following measurements were taken

| Height of student | 1.5 m |
| :--- | :--- |
| Distance from Student to Flagpole | 2 m |
| Angle of elevation of top of flagpole ( $\theta$ ) |  |

(a) Add these measurements to the diagram and show how the students could use them to calculate the height of the flagpole.

(b) The students calculated the height of the flag pole and found it to be 9.9 m . Unfortunately, before they could hand in their work, an ink blot spilled on it and covered the angle value. They did not want to go out and measure it again. Sophie suggested they work backwards to find the missing angle.

Find the missing angle by working backwards. You will need to use the table below.

| Angle $\theta$ | Tan $\theta$ |
| :--- | :--- |
| 38 | .7813 |
| 37 | .7536 |
| 36 | .7265 |
| 35 | .7002 |
| 34 | .6745 |
| 33 | .6494 |



## Question

(a) 100 students taking part in a Censusatschool survey had their reaction times for a task checked online. The results are shown below.


The students were allowed to practise the task and their reaction times were tested again; the results are shown below.


Do you think that this evidence suggets that reaction times can improve with practice? Explain your thinking.


## Question

On each spinner write five numbers to make the statements correct.
(i) It is certain that you will get a number less than 6 .

(ii) It is more likely that you will get an even number than an odd number.

(iii) It is impossible that you will get a multiple of 2 .

(iv) It is likely you will get a prime number.


## Question

The following question was asked on the phase 10 Censusatschool questionnaire.


The data below are from groups of students chosen at random from Ireland and South Africa.

| No of Cars per Household |  |
| :--- | :--- |
| Ireland | South <br> Africa |
| 1 | 1 |
| 1 | 2 |
| 2 | 0 |
| 1 | 0 |
| 1 | 2 |
| 2 | 0 |
| 2 | 0 |
| 2 | 1 |
| 3 | 1 |
| 1 | 1 |
| 1 | 1 |
| 3 | 1 |
| 2 | 3 |
| 5 | 2 |
| 1 | 2 |
| 3 | 2 |
| 6 | 1 |
| 5 | 1 |
| 2 | 1 |
| 3 | 1 |
| 2 | 1 |
| 1 | 3 |
| 2 | 3 |
| 1 | 2 |
| 1 | 1 |
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|  |  |
| 2 |  |
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(a) Display the data in a way that allows you to compare the two groups.

(b) What do you notice about these two groups of students? Is there any evidence that households in one country have more cars than the other?.Explain your answer.

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Sophie and Amy were designing a game of chance to raise money for charity in their school. They agreed on the following:

- they would call the game Spin and Win
- they would charge 50 cent to play
- the rule would be: roll a die and spin the spinner shown and add the totals.

(a) Create a sample space showing all the possible outcomes.

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However, Sophie and Amy had different ideas about which outcomes would result in a win, a loss or the player getting their money back.

## Sophie's Idea

Money back: Get total of 13
Win $€ 1$ : Even number total
Lose: Anything else

## Amy's Idea

Money back: Even number total
Win €1: Odd total, but not Prime
Lose: Anything else
(b) What is the probability of winning if you play using Sophie's idea?

(c) What is the probability of getting your money back if you play using Amy's idea?

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(d) If you play using Amy's idea, is the probability of winning greater than or less than the probability of winning if you play using Sophie's idea? Explain your reasoning.

(e) If 180 people play the game using Sophie's idea, how much are they likely to raise for charity? Show how you worked out your answer.


## Question

Points $A, B$ and $C$ are marked on the coordinate grid below.

(a) Write down the coordinates of $A, B$ and $C$

(b) Point $D$ is such that $A B C D$ is a rectangle. Mark $D$ accurately on the diagram.
(c) Write down a property of a rectangle.

(d) Show that the rectangle $A B C D$ has the property that you wrote down in part (c).


## Question

(Suggested maximum time: 7 minutes)
John is drawing plans for a logo. The logo is in the shape of the letter V as shown.
(a) On the diagram plot three points that John will need to join in order to complete the Logo.
(b) Draw the axis of symmetry on the logo.


## Question

(a) Construct a triangle $A B C$, where $|A B|=6 \mathrm{~cm}|A C|=8 \mathrm{~cm}$ and $|B C|=10 \mathrm{~cm}$.
$\square$
(b) What type of a triangle is this? Mathematically prove that this is so.

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