For Examiner’s use only

<table>
<thead>
<tr>
<th>Question</th>
<th>Maximum Mark</th>
<th>Mark Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>11</td>
<td></td>
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<tr>
<td>2.</td>
<td>34</td>
<td></td>
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<tr>
<td>3.</td>
<td>10</td>
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<td>4.</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td></td>
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</tbody>
</table>

ADDITIONAL MATERIALS

A pencil, calculator, ruler, protractor and a pair of compasses will be required for this paper.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer all the questions in the spaces provided.
Take \( \pi \) as 3.14 or use the \( \pi \) button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.
Unless stated, diagrams are not drawn to scale.
Scale drawing solutions will not be acceptable where you are asked to calculate.
The number of marks is given in brackets at the end of each question or part-question.
1. Amy is making a short film as part of her college course. It will take a day and a half for the filming. Amy will take one full day at the studio to edit the film.

She has written a plan, which includes costs, as given below:

**PLAN**

**CAST**
Three college friends will act in the film for free.

**SCRIPT**
There will be no cost for the script chosen.

**LOCATION**
3 locations needed.
Cost is a one-off fee of £10 per location.

**EQUIPMENT**
The cost per day, or part of a day, for the equipment to be hired:
- Camera £40
- Tripod £5
- Sound recorder £15
All other equipment free.

**INSURANCE**
Insurance is £75 in total. This is essential.

**FILMING CREW**
4 members of the college course will do the work at HALF the normal rate of pay.
Normal rate of pay (per person): £60 per half day.

**TRAVEL**
Hire of the college minibus at a total cost of £15 plus 50p per mile travelled.
The total mileage will be 80 miles.

**CATERING**
Altogether, there will be 8 people to feed at each mealtime.
Breakfast and lunch for everyone on the first day.
Breakfast only for everyone on the second day.
Each breakfast costs £3.50.
Each lunch costs £4.50.

**EDITING STUDIO**
Book a studio at the college for editing the film.
This costs £50 for a full day or £30 for a half day.

**WEATHER**
The weather forecast for the Monday and Tuesday is sunny.
She plans to book everyone, along with all the equipment required, for a full day on a Monday, and also for the Tuesday morning.

Amy has been given £750 to spend on producing this short film.

Is she going to have money left over after the filming and editing, or will she have overspent?

Either state how much money she will have left over, or state by how much she will overspend. [10]
If Amy has money left over, suggest how she could spend this money on improving the short film.

Otherwise, if she has overspent, suggest how she could cut down on the costs. [1]
2. A community group decides that it would be a great idea to arrange a music festival in their town.

A farmer has agreed to remove the fencing between three rectangular fields to make one large, main festival site.

![Diagram not drawn to scale]

Calculate the total area of the main festival site. [5]

Describe a suitable check to see if this area is correct. [1]
The community group decides to use 90% of the total area of the main festival site for the **public area**.

The remaining 10% of the total area will be used for the 2 stages, the food and drink area, the toilets and the organisers' area.

They decide that a safe number of people to be at the festival will be 1 person per 10 m\(^2\) in the public area.

Calculate the maximum number of people that they decide to allow within the **public area** of the festival site.

You must show all your working. [4]
For the festival they will need 1 toilet for every 400 people.
The toilets chosen come as blocks of 5 unisex toilets.
Each of these blocks of 5 toilets fits within an area measuring 5 m by 10 m.

Calculate the total area that will be used for the toilets at the festival. [5]

Total area used for the toilets = .................. m²

The diagram on the opposite page is a scale drawing of the festival site.
The two performance stages will be square in shape with both measuring 50 m by 50 m.
So that the noise doesn't carry from one stage to another, the stages need to be placed at least 1 km apart.
The food and drink area will be a large rectangular area, measuring 150 m by 100 m. This will need to be located in a fairly central area.
The toilets will need to be split into two separate locations on the festival site.
Both toilet locations, made up of many toilet blocks, should be rectangular and have an area that is similar in size to each other.
The two toilet locations should be placed at least 200 m away from the food and drink area. They should also be placed at least 600 m away from each other.

Use this information to show a possible location for the stages, food and drink area and toilet locations.
Label the appropriate areas on the scale drawing. [6]
Scale 1 cm = 50 m
Before working out the price of the tickets, the community group needs to work out the costs involved.
They make notes of the information needed in order to calculate these costs.

**Cost of hiring farmer’s field:**
£750 per hectare

**Main bands:**
2 headline bands (1 per stage) cost £50 000 each

**Supporting bands:**
7 bands per stage each costing £12 000

**A fence will be needed around the outside boundary of the main festival site**

**A neighbouring farmer will take responsibility for, and income from, parking and camping, at his own cost**

**Perimeter fencing at £75 per 100 m (price includes hiring and putting up)**

**Advise festival-goers to bring their wellingtons**

**All services:**
including stages, toilets, sound system, electricity to the site, security etc £45 000

Calculate the total cost identified by the community group in order to hold the festival. [7]
The community group decides to add on 20% of the total costs identified so far to cover any further costs. This increased value will be referred to as the final cost.

Calculate the final cost. [2]

Final cost = £ .........................

The community group hope to cover the final cost and make a profit of at least 50% of the final cost.

They estimate that the total number of people that will attend the festival is 36,500.

One fifth of these people will gain free entry.

The ticket price will be £20.

Based on this information, show whether or not the community group will make a profit of at least 50% of the final cost. [4]
3. The residents of a village were worried about drivers speeding along the main road through their village.

The local council decided to conduct a short survey. They stopped drivers and asked them if they would agree to answer a few questions. The survey did not ask for the driver’s name.

Here are the questions that were asked.

1. (a) To which age category do you belong?  
   - Up to and including 23
   - 24 and over

   (b) Gender  
   - Male
   - Female

2. Have you been caught driving at over the 30 mph limit in the last 5 years?  
   - Yes
   - No

3. How many attempts did it take to pass your driving test?  

The results for question 1 are shown in the following table.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to and including 23 years old</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>24 years old and over</td>
<td>7</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>

Of the drivers who admitted that they had been caught speeding, the results of question 1 are given in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to and including 23 years old</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>24 years old and over</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>
Do you believe it is necessarily correct to state that female drivers over the age of 24 are more likely to be caught speeding than any other category of drivers?

Use an appropriate comparison of the results in the two given tables to support your answer.
The responses to question 3, asking how many attempts the drivers had taken to pass their driving test, were collected and are shown in the table below:

<table>
<thead>
<tr>
<th>Number of attempts taken to pass their driving test</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>////</td>
<td>/</td>
</tr>
<tr>
<td>2</td>
<td>/////</td>
<td></td>
</tr>
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<tr>
<td>10</td>
<td>/</td>
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</table>

For these 25 drivers, calculate the mean, median and mode of the number of attempts taken to pass their driving test. [5]
Which of the mean, median and mode, previously calculated, will change if the driver who had taken 10 attempts to pass the driving test was not included within the results of this survey?

Give a reason for your answer.
4. Gwen thinks that taking a shower uses much less water than taking a bath.

To estimate the volume of water in her bath, Gwen considers the flow of water through the taps. When open, water from the hot water tap flows at an average rate of 120 ml per second. When open, water from the cold water tap flows at an average rate of 150 ml per second.

Having put the plug in place, Gwen starts by opening the hot water tap, and lets it run for 30 seconds. She then opens the cold water tap, and lets both taps run for a further 4 minutes. She then closes the hot water tap and lets the cold water tap run for another 40 seconds, before finally closing the cold water tap.

Calculate an estimate for the volume of water, in litres, that Gwen has in her bath.  [6]
Gwen’s shower uses water at a rate of 8 litres per minute. She usually showers for 5 minutes.

What percentage of water does she save by taking a shower rather than taking a bath? [4]