

Section C

This section is marked out of 100. The marks achieved account for 25% of your final exam result.

Instructions to candidates: Answer ALL four questions. Questions 1, 2 and 3 carry 20 marks each, question 4 carries 40 marks. Round your answers to 2 decimal places. Always carefully explain how you got your results. Calculators are permitted.

Question 1

Sam wants to buy a motorbike that costs £5,000. He can pay the entire amount now or choose a payment plan that consists of paying £2,000 now and £3,500 after 1 year.

- (a) What is the implied yearly interest rate for the payment plan?
(7)
- (b) What is the implied monthly interest rate for the payment plan?
(7)
- (c) Sam decides to wait for one year so he will have enough money to buy the motorbike in cash. He deposits £3,600 in a savings account that pays a 3% interest yearly rate. How much money will have in this account after 1 year?
(6)

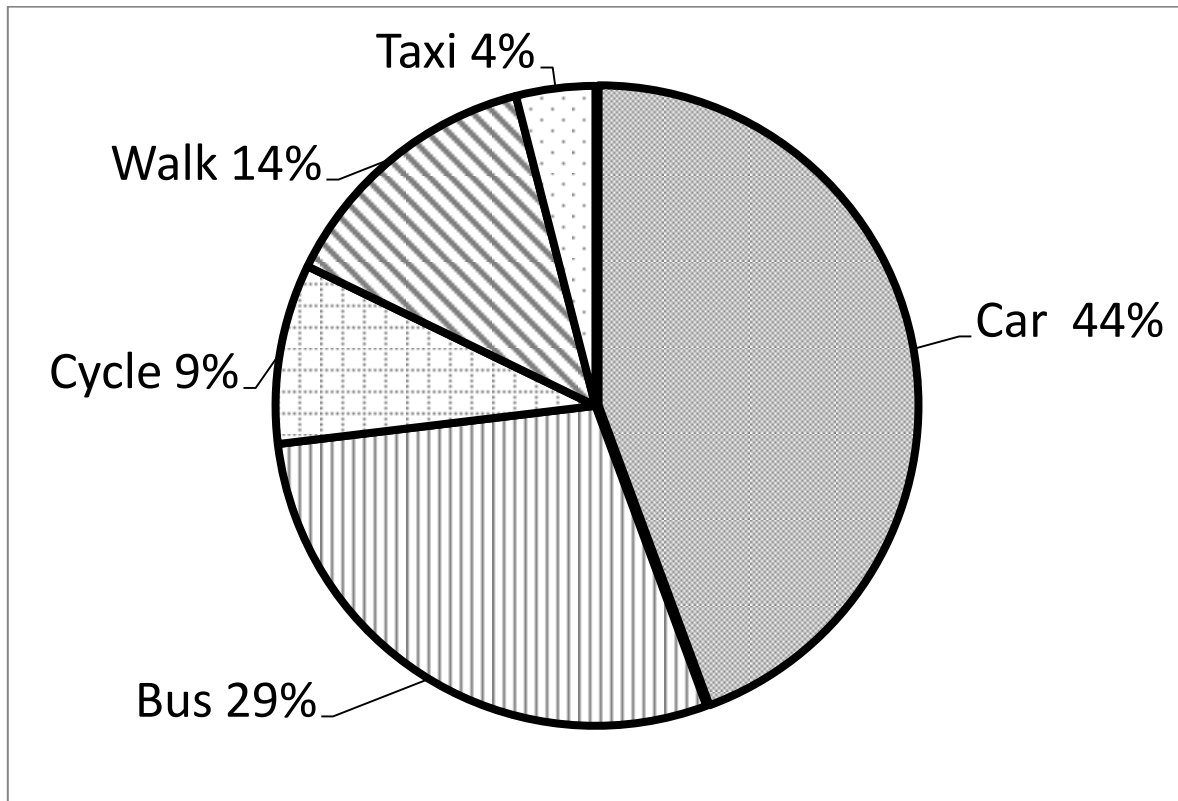
Question 2

The sale price of a motorbike is £5000. It includes a 20% tax (VAT) that the seller has to pay to the government.

- (a) What is the amount of money that the seller gets to keep after paying VAT?
(4)
- (d) Assume that the government approves an increase to the Value Added Tax (VAT) from 20% to 25%. Given that the seller wants to make the same amount of money, what is the new price?
(8)
- (e) Would a 5% discount on the new price of the motorbike bring the price back to £5,000? Explain your answer.
(8)

Question 3

275 people were interviewed about what means of transportation they normally use to go to work. The chart below reports their answers.



- (a) How many people usually take the bus to work?

(4)

- (b) What values of x satisfy the equation?

$$7x - 10 = 3(x + 1) - 9$$

(8)

- (c) What values of x satisfy both the following inequalities?

$$\begin{cases} x - 5 \geq \frac{4}{5}x + 3 \\ 100 - \frac{1}{6}x \geq \frac{1}{3}x + 80 \end{cases}$$

(8)

Question 4

School A employs 17 teachers and serves students coming from 4 different villages. The table below reports the number of students enrolled in school A by village of origin and the distance between the centre of each village and school A.

	Number of students	Distance to school A (km)
Village A	8	5
Village B	25	67
Village C	13	42
Village D	36	21

(a) What percentage of students come from Village A?

(8)

(b) Assuming that the number of students enrolled in the school increases by 2% every year, how many students will be enrolled in this school in 2 years (approximate to the nearest unit)?

(8)

(c) Every morning a school bus leaves from the centre of each village and takes the students to school A. The driving time can be computed as follows:

$$y = 5 + \frac{1}{2}x$$

Where y represents the driving time (in minutes) and x represents the distance (in km).

Draw the graph of this equation on the xy -plane

(8)

(d) Using the distance information from the table above compute the driving time of each school bus.

(8)

(e) Compute the total daily cost of the school bus service knowing that each bus completes a round trip from the centre of each a village to the school each day. Assume that the cost of fuel is £0.24 per km, the drivers are paid £75 per driving hour and other costs amount to £60 per day.

(8)