1 A biased five-sided spinner is numbered 1 to 5.
Terry spins this spinner 200 times and it lands on the number three 62 times.
Pat spins this spinner 300 times and it lands on the number three 88 times.

(a) Who will obtain the more reliable estimate of the probability that it lands on the number three? Give a reason for your answer.

..... because .....

..... **[1]**

(b) Use the results to work out the best possible estimate of the probability that the spinner will land on the number three.

(b) ..... **[2]**

2(a Mandi writes a questionnaire about music.
Here is one of her questions and the response boxes for it.

How many CDs do you own?

0 – 5 ☐ 5 – 10 ☐ 10 – 15 ☐ 15 – 20 ☐

Mandi has made two different types of error in the categories she has chosen.

Explain what these errors are.

1 _____

_____

2 _____

_____

[2]

(b) Mandi analyses the length of time of each track on her CDs.
This table summarises the results.

Length (t seconds)	Frequency
$0 < t \leqslant 100$	2
$100 < t \leqslant 200$	10
$200 < t \leqslant 300$	15
$300 < t \leqslant 400$	9
$400 < t \leqslant 500$	3
$500 < t \leqslant 600$	1

Calculate an estimate of the mean length of time of these tracks.

(b) _____ seconds **[4]**

3 Body Mass Index (BMI) is used by doctors to check if a person is a healthy weight for their height.

$$\text{BMI} = \frac{w}{h^2}$$

w is the weight (in kilograms) and h is the height (in metres) of the person.

This table shows how to interpret the value of a person's BMI.

BMI	
BMI $\leqslant$ 18.5	Underweight
18.5 < BMI $\leqslant$ 25	Normal
25 < BMI $\leqslant$ 30	Overweight
BMI > 30	Obese

Alex is 1.9 m tall and weighs 100.4 kg.

(a) Use **approximation** to find an estimate of Alex's BMI value.
Show clearly the approximations you use.

(a) _____ **[3]**

(b) **(i)** Is your answer to part **(a)** an underestimate or an overestimate? Explain your answer.

_____

_____

_____ **[1]**

(ii) What advice should Alex's doctor give him? Explain your answer.

_____

_____

_____ **[1]**

4 Mark has a voucher that gives him 22% off the prices at *Cordula's Hardware Store*. **Estimate** how much he will pay for an electric drill that normally costs £87.99.

£ _____ **[3]**

5 The acceleration of a drag racing car, a m/s^2, is calculated using this formula.

$$a = \frac{v - u}{T - t}$$

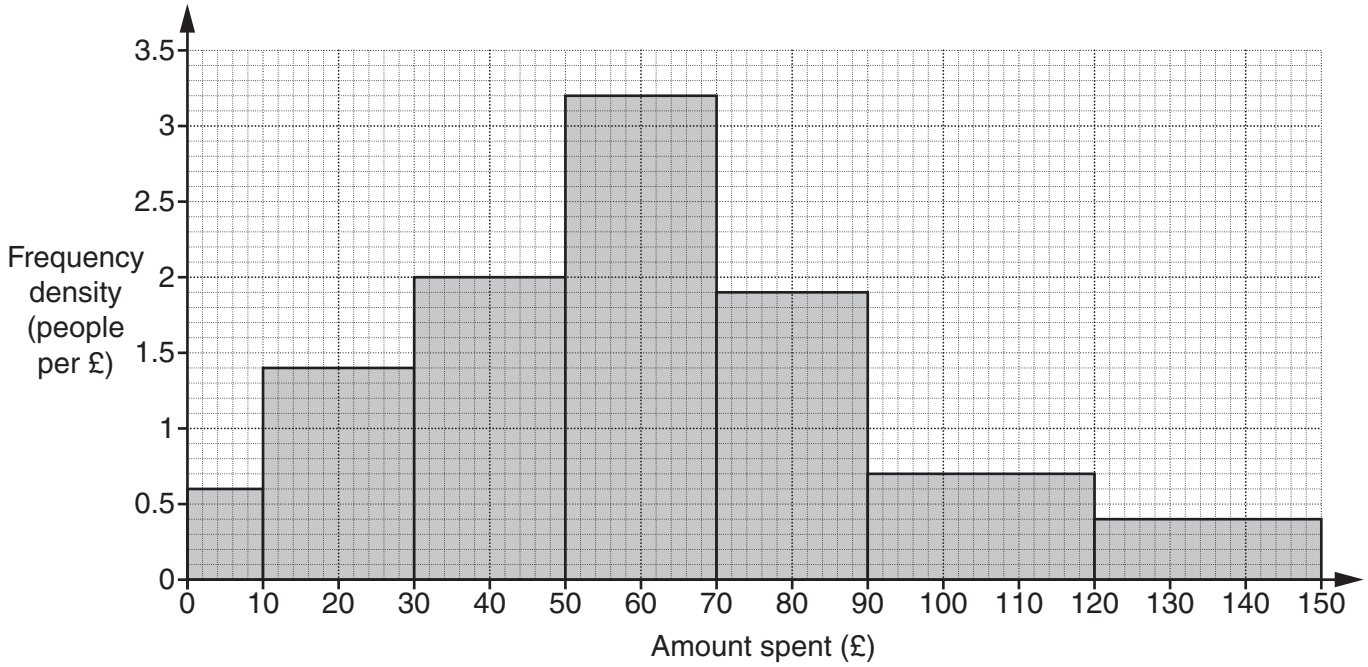
u m/s is the velocity after time t seconds and v m/s is the velocity after time T seconds.

A drag racing car accelerates along a straight course.
After 1.3 seconds its velocity is 49.5 m/s, after 3.26 seconds its velocity is 124.1 m/s.

Work out an **estimate** of the acceleration of the drag racing car.

_____ m/s^2 **[3]**

6 This histogram shows the distribution of the amounts spent on fuel at a petrol station one day.



(a) Estimate how many people spent over £100.

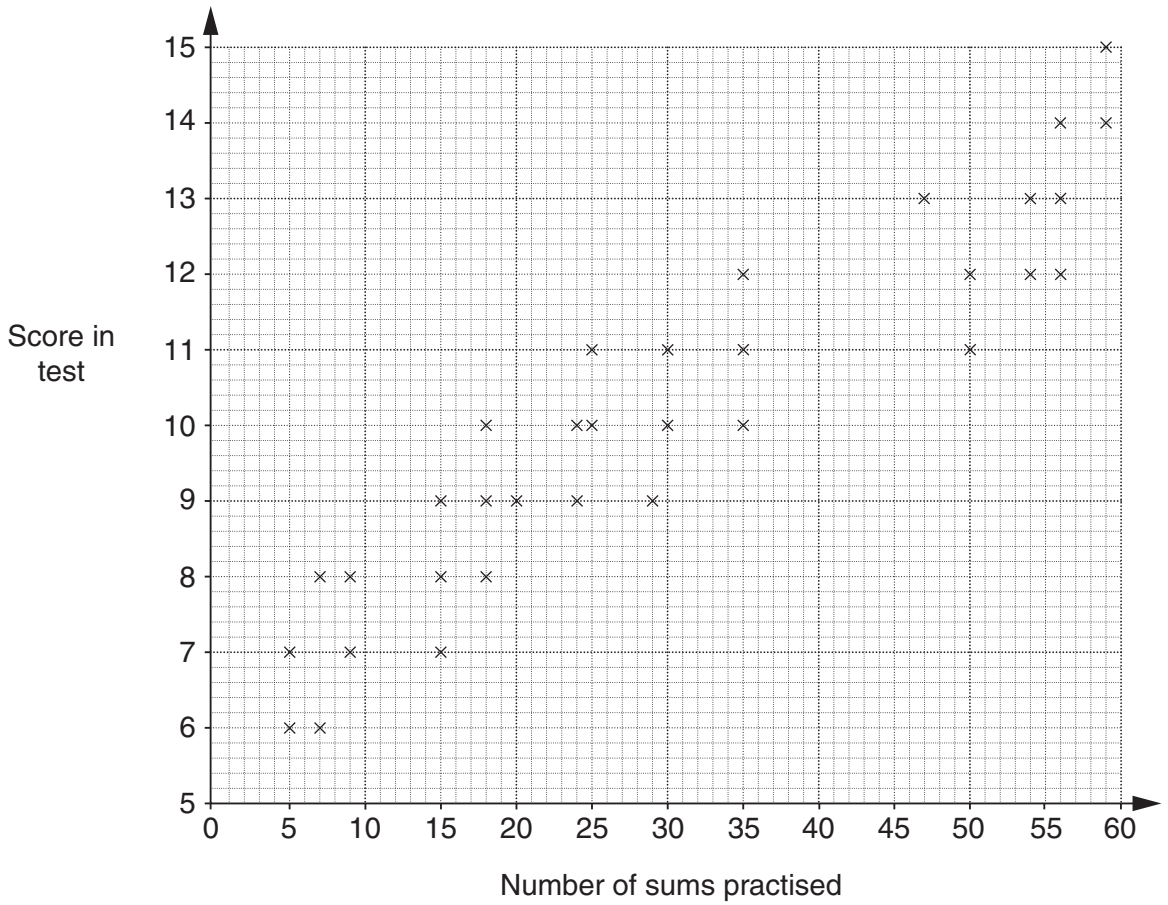
(a) ..... **[2]**

(b) Complete the frequency table and use it to calculate an estimate of the mean amount spent on fuel at the petrol station that day.

Amount spent (£a)	Frequency
$0 < a \leqslant 10$	6
$10 < a \leqslant 30$	28
$30 < a \leqslant 50$	
$50 < a \leqslant 70$	
$70 < a \leqslant 90$	
$90 < a \leqslant 120$	
$120 < a \leqslant 150$	

(b) £ ..... **[5]**

7 Pia uses a computer to help her revise.
Each time, Pia practises a number of sums and then takes a test, scored out of 15.
For each test, Pia records the number of sums practised and the score on the test.
She draws this scatter graph.



One day, Pia practised 42 sums but did not have time to take the test.
She decides to use a line of best fit to estimate her likely score in the test.

(a) On the grid, draw a line of best fit. **[1]**

(b) Use your line of best fit to estimate a score for Pia.

(b) .....**[1]**

(c) What type of correlation is shown?

(c) .....**[1]**