3: A garage sold 250 new cars which work using one of three types of engine: petrol, diesel or electric.

For each car, the garage recorded the month it first experienced an engine problem, if it occurred during the first year after being sold.

The results for the 250 cars are shown in the table.

	When the car first experienced an engine problem			
	Month 1–6	**Month 7–12**	**None**	**Total**
Petrol engine	12	25	95	132
Diesel engine	10	8	17	35
Electric engine	14	10	59	83
Total	36	43	171	250

The results are to be used to investigate whether or not there is an association between when the car first experienced an engine problem and the type of engine.

(a) Calculate the expected frequency for a **diesel** engine that first experienced an engine problem during **month 1–6**

(2)

Given that for the other 8 classes $\sum \frac{(O-E)^2}{E} = 7.444$ to 3 decimal places,

(b) test, at a 5% level of significance, whether or not there is evidence of an association between when the car first experienced an engine problem and the type of engine. You should state the hypotheses, the test statistic, the degrees of freedom and the critical value used for this test.

(7)

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Question 3 continued

(Total for Question 3 is 9 marks)