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3 A photocopier in a school is known to break down at random at a mean rate of 8 times per week.

(a) Give a reason why a Poisson distribution could be used to model the number of breakdowns.

(1)

The headteacher of the school replaces the photocopier with a refurbished one and wants to find out if the rate of breakdowns has increased or decreased.

(b) Write down suitable null and alternative hypotheses that the headteacher should use.

(1)

The refurbished photocopier was monitored for the first week after it was installed.

(c) Using a 5% level of significance, find the critical region to test whether the rate of breakdowns has now changed.

(3)

(d) Find the actual significance level of a test based on the critical region from part (c).

(2)

During the first week after it was installed there were 4 breakdowns.

(e) Comment on this finding in the light of the critical region found in part (c).

(2)

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Q3

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