MTH6157

Example question on statistical tests

An insurance company has been using the same standard table to calculate premium rates and reserves for term insurance policies since 2017. An actuary wishes to examine whether the continued use of the table is still appropriate and uses data for the last year which is summarised in the table below where the standard table forces of mortality are denoted by μ_x^s.

Age, *x*	Exposed to Risk	Actual Deaths	μ_x^s
65	1933	21	0.011
66	1994	20	0.014
67	2143	36	0.018
68	1713	39	0.023
69	2297	56	0.028
70	2073	65	0.034
71	1956	71	0.041
72	1892	91	0.047
73	1898	99	0.055
74	2175	137	0.064
75	2285	163	0.075

(a) Complete a test of the overall goodness of fit of the observed mortality experience to the standard table rates stating clearly the null hypothesis being tested and your conclusion.
(b) What aspects of goodness of fit might not be revealed by the test in (a) above?
(c) Should the actuary be concerned about outliers in the data?
(d) Is there evidence of statistically significant under or over estimation of mortality in the continued use of the standard table?
(e) What might be the cause of your finding in (d) above?
(f) What are the likely financial consequences of this for the insurance company?