

Example IFoA past exam paper questions on Graduation

April 2017 Q10

The government statistical service in a country with a population of 10 million has estimated mortality rates among males in that country aged 20 to 99 years inclusive. It wishes to create a new standard mortality table.

- (i) Describe why the crude mortality rates should be graduated during the production of this standard mortality table. [3]
- (ii) Describe a suitable method of graduation for these mortality rates. [1]
- (iii) Explain the limitations of the method described in your answer to part (ii) in this situation. [2]

The government performs the graduation and compares the crude and graduated rates. Below are some of the results of the comparison:

<i>Value of individual standardised deviation at age x, z_x</i>	<i>Number of ages</i>
$z_x < -3$	0
$-3 \leq z_x < -2$	7
$-2 \leq z_x < -1$	16
$-1 \leq z_x < 0$	26
$0 \leq z_x < 1$	16
$1 \leq z_x < 2$	10
$2 \leq z_x < 3$	2
$z_x \geq 3$	3

- (iv) Assess the quality of the graduated rates for use as a new standard mortality table by applying TWO statistical tests to the above information. The two tests should each examine a different aspect of the graduation. [6]
- (v) Comment on the implications of your results in part (iv) for the government using the new standard mortality table for economic and financial planning purposes. [2]

[Total 14]