



AQA City & Guilds CCEA OCR Pearson WJEC

Information for centres

Estimating a mark for a unit or component using the z-score method

This document explains one approach to estimating the missing mark when a candidate is absent (for an acceptable reason) from a unit or a component in either a modular or a linear specification **when a mark is missing because the script has been lost or where a candidate has been unfairly disadvantaged, or where examination rules have been broken through no fault of the candidate.** Hereafter, any reference to 'component(s)' also applies to unit(s) in a modular specification.

Several other methods are available to awarding bodies and may be employed by them if necessary. Different procedures result in very similar estimates.

Under the procedure known as the z-score method, the difference between the candidate's estimate and the performance of candidates generally on the component in question is the same as the average difference between the candidate's performance and the performance of candidates generally on the other components.

If the candidate performed on average slightly better than candidates generally on the other components, then the estimate for the missing mark will be slightly above the general performance on that component.

The difference between the performance of the candidate in question and the performance of candidates generally is measured in terms of standard deviations. For example, a candidate whose performance on a component is slightly above the performance of candidates generally on that component might be half a standard deviation above the mean mark for that component. On another component, however, where his/her performance is slightly below the performance of candidates generally, he/she might be half a standard deviation below the mean mark. The number of standard deviations above or below the mean is called the z-score.

In linear GCEs in England, and in both linear and modular GCSEs throughout the UK, if a z-score approach is employed, it is standard practice for the calculation to use the available marks from all components in the specification it. Occasionally there will be exceptions to this practice for technical reasons.

In modular GCEs, the standard for AS and A2 units is different. Therefore, only AS marks are normally used in the z-score calculations for AS units and similarly only A2 marks are normally used in the z-score calculations for A2 units. This restriction on the use of AS and A2 units is waived for two-unit A Level qualifications. For these, a missing mark for the AS unit is estimated using the result for the A2 unit; a missing mark for the A2 unit is estimated using the result for the AS unit.

It should be recognised that the z-score approach may not prove suitable for some small entry options. In such cases, awarding bodies reserve the right to employ alternative approaches if necessary.

In the examples below the means and standard deviations are exact whole numbers. Of course this would be unlikely to occur in practice but it makes the principles easier to understand. The examples refer to linear qualifications and raw marks, but the same calculations would apply, in terms of uniform marks, for modular qualifications.

Example 1

In a two component linear specification the mean raw mark for all candidates on component 1 is 53 and the standard deviation is 5, while the mean on component 2 is 34 and the standard deviation is 3.

A candidate scores 43 on component 1 but is absent for component 2.

	<i>Mean</i>	<i>Standard deviation</i>	<i>Candidate's mark</i>
Component 1	53	5	43
Component 2	34	3	Absent

The candidate's mark on component 1 is 10 marks, or 2 standard deviations, below the mean. Therefore, the estimate for component 2 is also 2 standard deviations below the mean. This is

$$34 - (2 \times 3) = 28$$

Example 2

In a three component linear specification the mean raw marks for all candidates on components 1, 2 and 3 are 50, 80 and 38 respectively, with standard deviations of 8, 12 and 3. Component 1 accounts for 30% of the assessment, component 2 for 50% and component 3 for 20%.

A candidate scores 58 on component 1 and 104 on component 2 but is absent for component 3.

	<i>Weighting</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Candidate's mark</i>
Component 1	30%	50	8	58
Component 2	50%	80	12	104
Component 3	20%	38	3	absent

The candidate's mark on component 1 is 8 marks or 1 standard deviation above the mean and the candidate's mark on component 2 is 24 marks or 2 standard deviations above the mean. The average (taking account of the weightings) is

$$\frac{(30 \times 1) + (50 \times 2)}{(30 + 50)}$$

$$= 1.625$$

Thus, the estimate for component 3 is

$$\text{mean mark} + (1.625 \times \text{standard deviation})$$

$$= 38 + (1.625 \times 3)$$

$$= 42.875, \text{ which is rounded to } 43.$$