



## Glossary of numeracy terms

These terms are used in numeracy. You can use them as part of your preparation for the numeracy professional skills test. You will not be assessed on definitions of terms during the test.

### A

#### Accuracy

The degree of precision given in the question or required in the answer. For example, a length might be measured to the nearest centimetre. A pupil's reading age is usually given to the nearest month, while an average (mean) test result might be rounded to 1 decimal place.

### B

#### Bar chart

A chart where the number associated with each item is shown either as a horizontal or a vertical bar and where the length of the bar is proportional to the number it represents. The length of the bar is used to show the number of times the item occurs, or the value of the item being measured.

#### Box and whisker diagram

Diagram showing the range and quartile values for a set of data.

### C

#### Cohort

A group having a common quality or characteristic. For example, 'pupils studying GCSE German this year have achieved higher grades than last year's cohort' (pupils studying GCSE German last year).

#### Consistent

Following the same pattern or style over time with little change. For example, a pupil achieved marks of 84, 82, 88 and 85 % in a series of mock GCSE tests; her performance was judged to be consistently at the level needed to obtain GCSE grade A\*.

## Conversion

The process of exchanging 1 set of units for another. Measurement and currency, for example, can be converted from 1 unit to another, eg centimetres to metres, pounds sterling to euros. Conversion of 1 unit to the other is usually done by using:

- a rule (eg 'multiply by  $\frac{5}{8}$  to change kilometres into miles');
- a formula (eg  $F = \frac{9}{5}C + 32$ , for converting degrees Celsius to degrees Fahrenheit); or
- a conversion graph.

## Correlation

The extent to which 2 quantities are related. For example, there is a positive correlation between 2 tests, A and B, if a person with a high mark in test A is likely to have a high mark in test B and a person with a low mark in test A is likely to get a low mark in test B. A scatter graph of the 2 variables may help when considering whether a correlation exists between the 2 variables.

## Cumulative frequency graph

A graph in which the frequency of an event is added to the frequency of those that have preceded it. This type of graph is often used to answer a question such as, 'how many pupils are under nine-years-old in a local authority (LA)?' or 'what percentage of pupils gained at least the pass mark of 65 on a test?'

## D

## Decimal

Numbers based on or counted in a place value system of tens. Normally we talk about decimals when dealing with tenths, hundredths and other decimal fractions less than 1. A decimal point is placed after the unit's digit in writing a decimal number (eg 1.25). The number of digits to the right of the decimal point up to and including the final non-zero digit is expressed as the number of decimal places. In the example above there are 2 digits after the decimal point, and the number is said to have 2 decimal places, sometimes expressed as 2 dp. Many simple fractions cannot be expressed exactly as a decimal. For example, the fraction  $\frac{1}{3}$  as a decimal is 0.3333, which is usually represented as 0.3 recurring. Decimals are usually rounded to a specified degree of accuracy (eg 0.6778 is 0.68 when rounded to 2 dp. 0.5 is always rounded up, so 0.5 to the nearest whole number is 1).

## Distribution

The spread of a set of statistical information. For example, the number of absentees on a given day in a school is distributed as follows:

Monday: 5

Tuesday: 17

Wednesday: 23

Thursday: 12

Friday: 3

A distribution can also be displayed graphically.

## F

### Formula

A relationship between numbers or quantities expressed using a rule or an equation. For example, final mark =  $(0.6 \times \text{mark 1}) + (0.4 \times \text{mark 2})$ .

### Fraction

Fractions are used to express parts of a whole (eg three quarters). The number below the division line, the denominator, records the number of equal parts into which the number above the division line, the numerator, has been divided.

### Frequency

The number of times an event or quantity occurs.

## G

### Greater than

A comparison between 2 quantities. The symbol  $>$  is used to represent 'greater than', eg  $7 > 2$ , or  $> 5\%$ .

## I

### Interquartile range

The numerical difference between the upper quartile and the lower quartile. The lower quartile of a set of data has one quarter of the data below it and three quarters above it. The upper quartile has three quarters of the data below it and one quarter above it. The interquartile range represents the middle 50% of the data.

## L

### Line graphs

A graph on which the plotted points are joined by a line. It is a visual representation of 2 sets of related data. The line may be straight or curved. It is often used to show a trend, such as how a particular value is changing over time.

## M

### Mean

One measure of the 'average' of a set of data. The 'mean' average is usually used when the data involved is fairly evenly spread. For example, the individual costs of 4 textbooks are £9.95, £8.34, £11.65 and £10.50. The mean cost of a textbook is found by totalling the 4 amounts, giving £40.44 and then dividing by 4, which gives £10.11. The word 'average' is frequently used in place of the mean, but this can be confusing as both median and mode are also ways of expressing an average.

## Median

Another measure of the 'average' of a set of data. It is the middle number of a series of numbers or quantities when arranged in order, eg from smallest to largest. For example, in the following series of numbers the median is 7:

2, 4, 5, 7, 8, 15 and 18

When there is an even number of numbers, the median is found by adding the 2 middle numbers and then halving them. For example, in the following series of numbers the median is  $(23 + 30) / 2 = 26.5$ .

12, 15, 23, 30, 31 and 45

## Median and quartile lines

Quartiles can be found by taking a set of data that has been arranged in increasing order and dividing it into 4 equal parts. The first quartile is the value of the data at the end of the first quarter. The median quartile is the value of the data at the end of the second quarter. The third quartile is the value of the data at the end of the third quarter. Quartile lines can be used to show pupils' progression from 1 key stage to another, when compared with national or local data.

## Mode

Another measure of the 'average' of a set of data. It is the most frequently occurring result in any group of data. For example, in the following set of exam results the mode is 31% because this value appears most frequently:

30%, 34%, 36% 31%, 31%, 30%, 34%, 33%, 31% and 32%

## O

### Operations

The means of combining 2 numbers or sets of numbers. For example, addition, subtraction, multiplication and division.

## P

### Percentage

A fraction with a denominator of 100, but written as the numerator followed by '%', eg 30 over 100 or 30%. A fraction that is not in hundredths can be converted so that the denominator is 100, eg 65 over 100 = 65%. Percentages can be used to compare different fractional quantities. For example, in class A, 10 pupils out of 25 are studying French; in class B, 12 out of 30 pupils are studying French. However, both  $10/25$  and  $12/30$  are equivalent to  $4/10$ , or 40%. The same percentage of pupils, therefore, studies French in both these classes.

### Percentage points

The difference between 2 values, given as percentages. For example, a school has 80% attendance one year and 83% the next year. There has been an increase of 3 percentage points in attendance.

## Percentile

The values of a set of data that has been arranged in order and divided into 100 equal parts. For example, a year group took a test and the 60th percentile was at a mark of 71. This means that 60% of the cohort scored 71 marks or less. The 25th percentile is the value of the data such that 25% or one quarter of the data is below it and so is the same as the lower quartile. Similarly, the 75th percentile is the same as the upper quartile and the median is the same as the 50th percentile.

## Pie chart

A pie chart represents the 360° of a circle and is divided into sectors by straight lines from its centre to its circumference. Each sector angle represents a specific proportion of the whole. Pie charts are used to display the relationship of each type or class of data within a whole set of data in a visual form.

## Prediction

A statement based on analysing statistical information about the likelihood that a particular event will occur. For example, an analysis of a school's exam results shows that the number of pupils achieving A\* to C grades in science at a school has increased by 3% per year over the past 3 years. On the basis of this information the school predicts that the percentage of pupils achieving A\* to C grades in science at the school next year will increase by at least 2%.

## Proportion

A relationship between 2 values or measures. These 2 values or measures represent the relationship between some part of a whole and the whole itself. For example, a year group of 100 pupils contains 60 boys and 40 girls, so the proportion of boys in the school is 60 out of 100 or 3 out of 5. This is usually expressed as a fraction, in this case, three fifths.

## Q

### Quartile (lower)

The value of a set of data at the first quarter, 25%, when all the data has been arranged in ascending order. It is the median value of the lower half of all the values in the data set. For example, the results of a test were: 1, 3, 5, 6, 7, 9, 11, 15, 18, 21, 23 and 25. The median is 10. The values in the lower half are 1, 3, 5, 6, 7 and 9. The lower quartile is 5.5. This means that one quarter of the cohort scored 5.5 or less. The lower quartile is also the 25th percentile.

### Quartile (upper)

The value of a set of data at the third quarter, 75%, when that data has been arranged in ascending order. It is the median value of the upper half of all the values in the data set. In the lower quartile example, the upper quartile is 19.5, the median value of the upper half of the data set. Three-quarters of the marks lie below it. The upper quartile is also the 75th percentile.

## R

### Range

The difference between the lowest and the highest values in a set of data. For example, for the set of data 12, 15, 23, 30, 31 and 45, the range is the difference between 12 and 45. 12 is subtracted from 45 to give a range of 33.

## Ratio

A comparison between 2 numbers or quantities. A ratio is usually expressed in whole numbers. For example, a class consists of 12 boys and 14 girls. The ratio of boys to girls is 12:14. This ratio may be described more simply as 6:7 by dividing both numbers by 2. The ratio of girls to boys is 14:12 or 7:6.

## Rounding

Expressing a number to a degree of accuracy. This is often done in contexts where absolute accuracy is not required, or not possible. For example, it may be acceptable in a report to give outcomes to the nearest 100 or 10. So the number 674 could be rounded up to 700 to the nearest 100, or down to 670 to the nearest 10. If a number is half way or more between rounding points, it is conventional to round it up, eg 55 is rounded up to 60 to the nearest 10 and 3.7 is rounded up to 4 to the nearest whole number. If the number is less than half way, it is conventional to round down, eg 16.43 is rounded down to 16.4 to 1 decimal place.

## S

### Scatter graph

A graph on which data relating to 2 variables is plotted as points, each axis representing 1 of the variables. The resulting pattern of points indicates how the 2 variables are related to each other. This type of graph is often used to demonstrate or confirm the presence or absence of a correlation between the 2 variables, and to judge the strength of that correlation.

### Sector

The part or area of a circle which is formed between 2 radii and the circumference. Each piece of a pie chart is a sector.

### Standardised scores

Standardised scores are used to enable comparisons on tests between different groups of pupils. Tests are standardised so that the average national standardised scores automatically appears as 100, so it is easy to see whether a pupil is above or below the national average.

## T

### Trend

The tendency of data to follow a pattern or direction. For example, the trend of the sequence of numbers 4, 7, 11, 13 and 16 is described as 'increasing'.

## V

### Value-added

The relationship between a pupil's previous attainment and their current attainment gives a measure of their progress. Comparing this with the progress made by other pupils gives an impression of the value added by a school.

## Variables

The name given to a quantity which can take any 1 of a given set of values. For example, on a line graph showing distance against time, both distance and time are variables. A variable can also be a symbol which stands for an unknown number, and that can take on different values. For example, the final mark in a test is obtained by a formula using the variables A and B as follows: final mark = (Topic 1 mark x A) + (Topic 2 mark x B).

## W

### Weighting

A means of attributing relative importance to 1 or more of a set of results. Each item of data is multiplied by a pre-determined amount to give extra weight to 1 or more components. For example, marks gained in year 3 of a course may be weighted twice as heavily as those gained in the first 2 years, in which case those marks would be multiplied by 2 before finding the total mark for the course.

### Whole number

A positive integer (eg 1, 2, 3, 4, 5).

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