Skewness

Grade 6 | Worked solutions

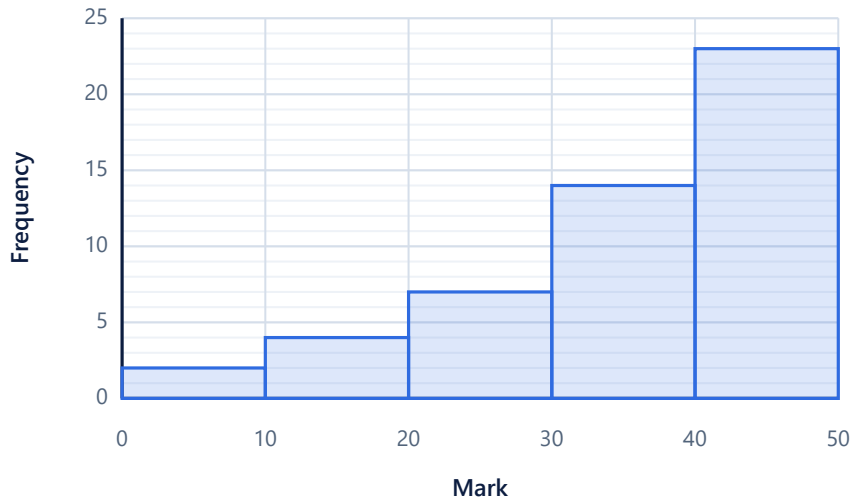
GCSE Statistics topic practice

1 The histogram shows the marks of 50 students in a test that was marked out of 50.

a. Describe the skew of the distribution of marks. (1)

b. Interpret the skew in the context of the test. (1)

c. Without doing any calculations, state whether the mean mark is greater than or less than the median mark. Give a reason for your answer. (1)



(3 marks)

a)

The long tail is on the left.

So the skew is negative.

b)

Most students scored high marks,

but a few scored low marks.

c)

The mean is less than the median.

The few low marks pull the mean down.

a) negative b) mostly high marks c) mean < median

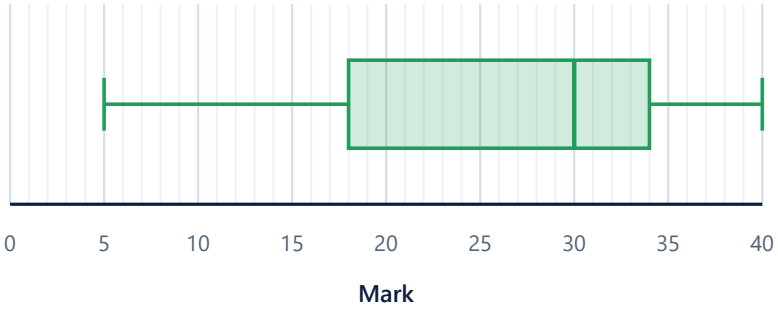
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2 A teacher gives her class a spelling test marked out of 40. Here is a summary of the marks.

Lowest mark	Lower quartile	Median	Upper quartile	Highest mark
5	18	30	34	40

a. On the grid, draw a box plot for this information. (2)

b. Describe the skew of the distribution of marks. Give a reason for your answer. (2)



(4 marks)

a)

Draw the box from 18 to 34.

Draw the median line at 30.

Draw the whiskers to 5 and to 40.

b)

Median - lower quartile = 30 - 18

= 12

Upper quartile - median = 34 - 30

= 4

The median is closer to the upper quartile.

So the skew is negative.

a) box 18 to 34, median 30, whiskers 5 and 40 b) negative

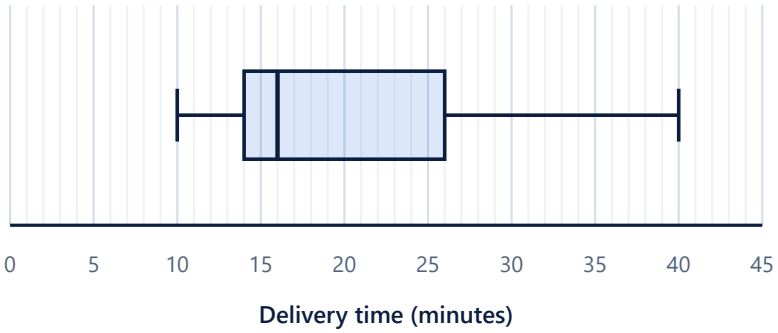
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3 The box plot shows the delivery times, in minutes, for the orders from a takeaway on one evening.

a. Describe the skew of the distribution of delivery times. Give a reason for your answer. (2)

b. Interpret the skew in the context of the delivery times. (1)

c. The owner wants to give customers a typical delivery time. Explain why the median is a better average to use than the mean. (1)



(4 marks)

a)

Median - lower quartile = 16 - 14

= 2

Upper quartile - median = 26 - 16

= 10

The median is closer to the lower quartile.

So the skew is positive.

b)

Most deliveries took a short time,

but a few took much longer.

c)

The few very long times pull the mean up.

The median is not affected by them.

a) positive b) mostly short, a few long c) not affected

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4 The table shows the mean and the median of the prices of the houses sold by two estate agents last year.

	Mean price	Median price
Agent A	£248 000	£215 000
Agent B	£231 000	£232 000

a. Describe the skew of the distribution of prices for each estate agent. Give a reason for each answer. (3)

b. For which estate agent is the mean a more suitable average to use? Give a reason for your answer. (1)

(4 marks)

a)

Agent A has 248 000 > 215 000

The mean is greater than the median.

So Agent A has positive skew.

For Agent B the mean and median

are almost equal.

So Agent B is roughly symmetrical.

b)

Agent B.

There is no skew, so the mean is not

pulled up by a few very high prices.

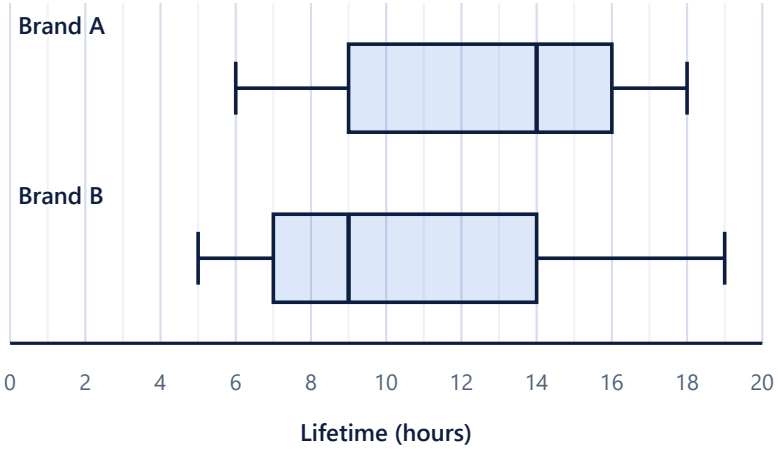
a) A positive, B symmetrical b) Agent B

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5 The box plots show the lifetimes, in hours, of samples of two brands of battery.

a. Describe the skew of the distribution of lifetimes for each brand. Give a reason for each answer. (3)

b. Anil wants batteries that usually last a long time. Which brand should he choose? Give a reason for your answer. (2)



(5 marks)

a)

Brand A

Median − lower quartile = 14 − 9

= 5

Upper quartile − median = 16 − 14

= 2

The median is closer to the upper quartile.

So Brand A has negative skew.

Brand B

Median − lower quartile = 9 − 7

= 2

Upper quartile − median = 14 − 9

= 5

The median is closer to the lower quartile.

So Brand B has positive skew.

b)

Brand A.

Its median is higher, 14 hours > 9 hours.

Most Brand A batteries last a long time,

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with only a few short lifetimes.

a) A negative, B positive b) Brand A, higher median

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