Changing data: effect on the mean and standard deviation

Grade 9 | Higher | 5 questions, 22 marks

GCSE Statistics topic practice

Name: _____ **Date:** _____ **Score:** _____ **/ 22**

1 The midday temperature in a town was recorded on each day in June. The temperatures had a mean of 15 °C and a standard deviation of 4 °C.

A temperature of C degrees Celsius is changed to F degrees Fahrenheit using the formula $F = 1.8C + 32$

a. Work out the mean of the temperatures in degrees Fahrenheit. (1)

b. Work out the standard deviation of the temperatures in degrees Fahrenheit. (1)

c. Explain why adding 32 to every temperature does not change the standard deviation. (1)

(3 marks)

2 The 20 workers at a factory have a mean weekly wage of £480 with a standard deviation of £36.

a. Every worker is given a 5% pay rise and then a further £10 a week. Work out the new mean and the new standard deviation of the weekly wages. (2)

b. Instead of the pay rise, a new worker joins the original 20 workers on a weekly wage of exactly £480. Calculate the standard deviation of the weekly wages of the 21 workers. Give your answer correct to the nearest penny. (2)

(4 marks)

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3 Kwame records the mass, x kg, of each of 10 parcels. For his recorded masses

$\Sigma x = 150$ and $\Sigma x^2 = 2410$

a. Work out the mean and the standard deviation of the recorded masses. (2)

b. Kwame then finds that he recorded one parcel as 23 kg when its mass was really 13 kg. Work out the correct mean and the correct standard deviation of the 10 masses. (3)

(5 marks)

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4 The marks, x, in a Statistics test had a mean of 52 and a standard deviation of 12. The highest mark was 96.

The teacher scales every mark using $y = ax + b$ where a and b are positive numbers. The scaled marks, y, have a mean of 60 and a standard deviation of 9.

a. Work out the value of a and the value of b. (3)

b. Ravi says, "Every student's scaled mark is higher than their original mark." Show that Ravi is not right. (2)

(5 marks)

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5 A class is split into two groups for a French speaking test. The table shows information about the marks.

	Number of students	Mean mark	Standard deviation
Group A	12	60	5
Group B	8	70	10

a. Work out the mean mark for all 20 students. (2)

b. Calculate the standard deviation of the marks of all 20 students. Give your answer correct to 3 significant figures. (3)

(5 marks)

End of questions | Total 22 marks

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