THE STANDARD DEVIATION AS A MEASURE OF SPREAD

1 You conduct a survey of your class to find the number of pets for each member of the class.

Number of pets: 0, 4, 1, 1, 6, 3, 8, 4, 2, 0, 0, 0, 1, 1, 4, 6, 2, 3, 4, 1.

(a) What is the mean number of pets?

(b) When finding the standard deviation you [**can / cannot**] regard this as a population, so you will find the [**population / sample**] standard deviation.

(c) Use a spreadsheet structure on your technology to find the standard deviation, correct to 2 decimal places. What is its value?

2 The data set shown represents the length of a sample of fish, measured to the nearest centimetre, caught by a commercial fishing boat.

Length of fish (nearest cm)	Number
20–29	8
30–39	12
40–49	24
50–59	38
60–69	54
70–79	49
80–89	21
90–99	7

Use appropriate technology to find the following values, correct to 2 decimal places.

(a) the mean **(b)** the standard deviation

3 The number of goals Irene scored each week in her netball competition was recorded for part of the season.

Goals: 42, 39, 42, 43, 29, 33, 30, 45, 40, 27, 29, 33, 38, 42, 46

(a) You can reasonably assume these values refer to a [**sample / population**].

(b) Find the mean and the standard deviation for the data. Give the values rounded to 2 decimal places, if necessary.

(c) In the next round Irene is injured early in the game and scores only 3 goals. Find the new mean and standard deviation.

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5 Consider the following simple data set which represents the number of people in the queue for an ATM at a bank at different times of day: 7, 3, 2, 4, 6, 7, 3, 5, 7, 3, 7, 2, 4, 6, 7, 2, 6, 4, 5.

(a) The interquartile range is: **A** 4 **B** 4.7 **C** 5 **D** 7

(b) Calculate the standard deviation.

(c) Calculate the population standard deviation.

7 A factory has two machines which make the same product. The weights, correct to the nearest gram, of samples of 10 cakes from the two machines are shown in the table below. The target weight is 60 g.

Machine A	59	56	57	62	63	63	60	59	58	59
Machine B	57	58	63	60	61	62	61	62	58	58

(a) Find the mean weight for each machine.

(b) If production is stopped if the mean weight is more than 0.5 g from the target weight of 60 g, would either machine be shut down?

(c) Find the sample standard deviation for each machine, correct to 2 decimal places.

(d) If production is stopped when the sample standard deviation is more than 2.25 g, would either machine be shut down?