Quality assurance and control charts

Grade 8 | Higher | 5 questions, 21 marks

GCSE Statistics topic practice

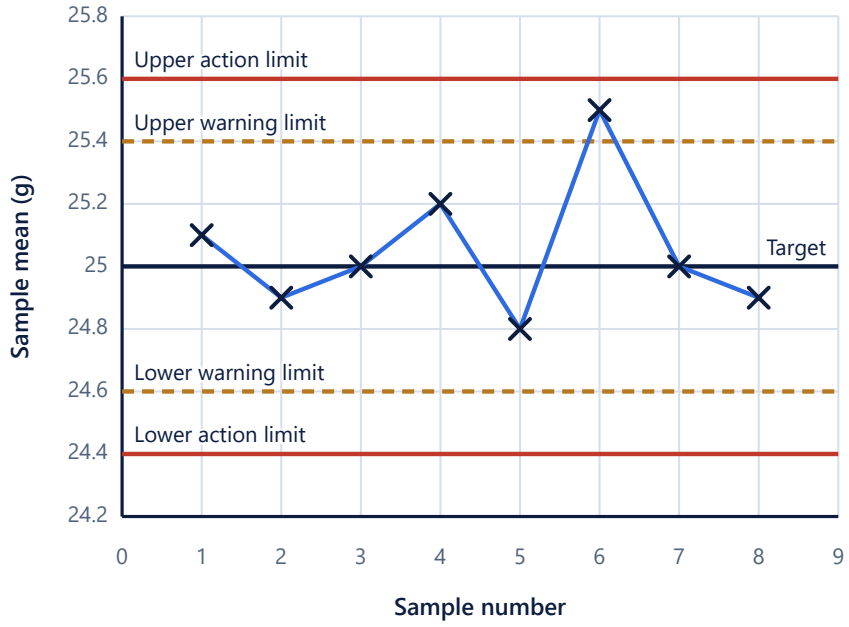
Name: _____ **Date:** _____ **Score:** _____ **/ 21**

1 A machine fills packets with crisps. The target mass is 25 g. Every 30 minutes a sample of packets is taken and the mean mass is plotted on the control chart. The chart shows the means of 8 samples.

a. Write down the number of the sample whose mean is outside the warning limits. (1)

b. Sample 7 was taken straight after that sample. Explain why the machine was then allowed to carry on running. (1)

c. Give one reason why samples are used instead of weighing every packet. (1)



(3 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

2 A factory makes chocolate bars. Every hour a sample of 5 bars is taken and the range of their masses is plotted on the control chart. The chart shows the ranges for the first 5 samples.

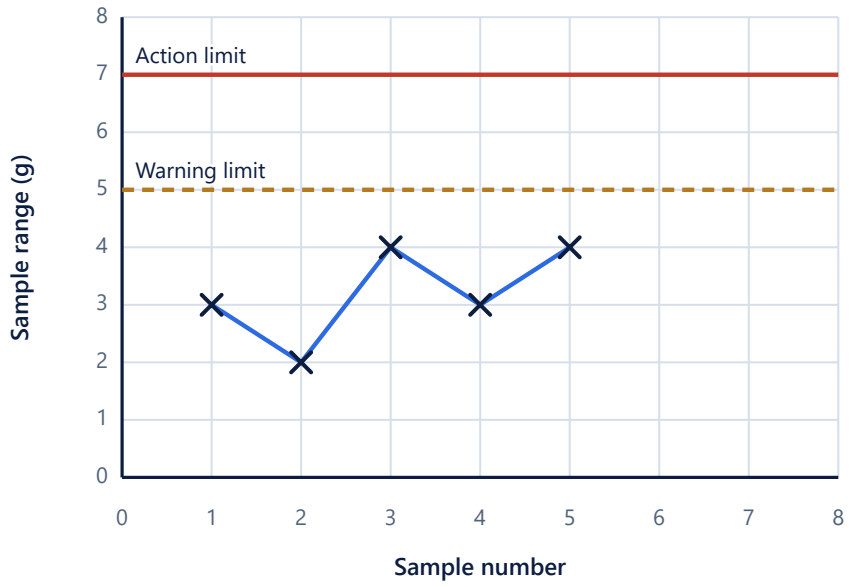
The masses, in grams, of the 5 bars in sample 6 are

48 51 46 52 50

a. Work out the range for sample 6 and plot it on the control chart. (2)

b. Describe what should be done after sample 6 is taken. Give a reason for your answer. (1)

c. Explain why this control chart does not need lower limits. (1)



(4 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

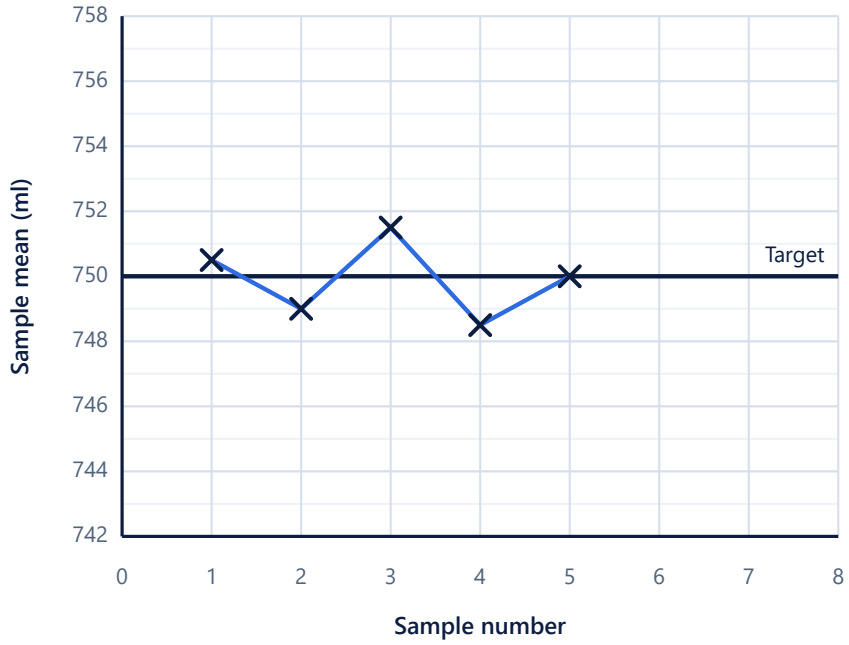
3 A machine fills tins with paint. When the machine is working correctly, the sample means have a target value of 750 ml and a standard deviation of 2 ml.

The warning limits are set 2 standard deviations from the target value. The action limits are set 3 standard deviations from the target value.

The control chart shows the target value and the means of the first 5 samples.

a. Work out the upper and lower warning limits and the upper and lower action limits. (2)

b. Draw and label the warning limits and the action limits on the control chart. (2)



(4 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

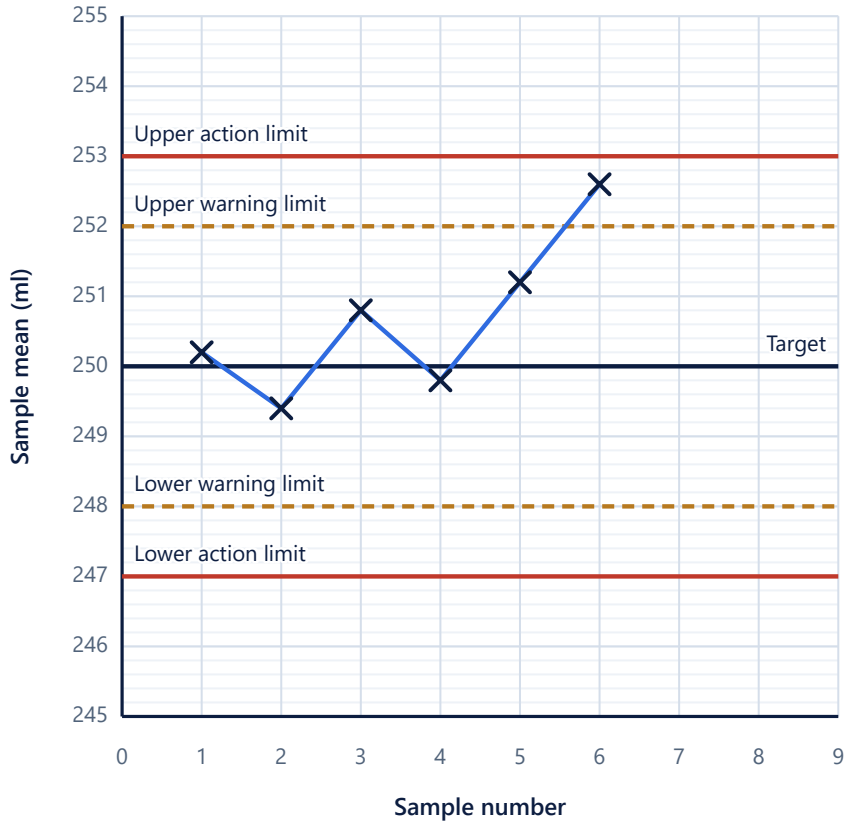
4 A machine fills bottles with juice. The target volume is 250 ml. Every hour a sample of 5 bottles is taken and the mean volume is plotted on the control chart. The chart shows the means of the first 6 samples.

The mean of sample 7 is 250.6 ml and the mean of sample 8 is 246.4 ml.

a. Plot the means of samples 7 and 8 on the control chart. (1)

b. Describe what should be done after sample 6 is taken. Give a reason for your answer. (2)

c. Describe what should be done after sample 8 is taken. Give a reason for your answer. (2)



(5 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

5 A machine makes bolts with a target diameter of 10.0 mm. Every hour a sample of 5 bolts is taken and the mean diameter is plotted on the control chart. The chart shows the means of the first 8 samples.

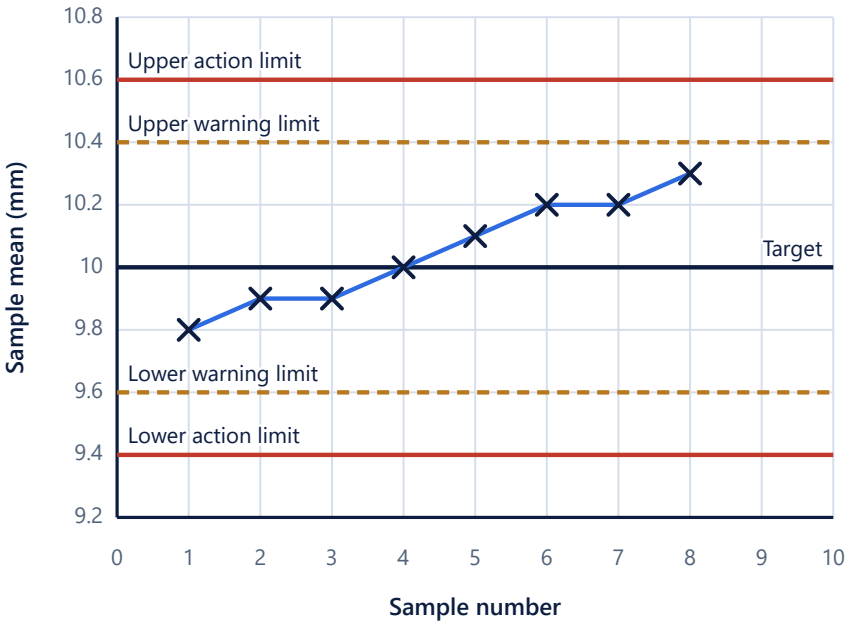
The diameters, in mm, of the 5 bolts in sample 9 are

10.5 10.9 10.6 10.8 10.7

a. After sample 8 the manager says, "All of the sample means are inside the warning limits, so there is nothing to worry about." Comment on the manager's statement. (2)

b. Work out the mean for sample 9 and plot it on the control chart. (2)

c. Describe what should be done after sample 9 is taken. Give a reason for your answer. (1)



(5 marks)

End of questions | Total 21 marks

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.