

10 A student measures the circumference of a circular pipe.

He wraps a length of string around the pipe five times and marks it with ink, as shown in the photograph.



- (a) The student unwraps the string and holds it against a ruler with a centimetre scale. The next photograph shows the first two ink marks on the string.



- (i) Estimate the circumference of the pipe, using the photograph of the string and the centimetre scale.

Give your answer to two significant figures.

(2)

estimated circumference = cm

- (ii) The student finds that the total length of string for 5 turns is 25.6 cm.

Calculate the average (mean) circumference of the pipe using this value.

(1)

average circumference = cm

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(iii) The student measures the **diameter** of the pipe using a digital calliper.



The calliper shows that the diameter is 15.10 mm.

Calculate the circumference of the pipe using the formula

$$\text{circumference} = \text{diameter} \times \pi$$

(2)

calculated circumference = cm

(b) The student uses two methods to find the circumference

- averaging, using a measured length of string
- calculating, using the digital calliper reading

Explain why the two methods are likely to give different results.

(4)

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