

### Question #78805, Chemistry / General Chemistry

The volumes delivered by a 20.00 mL pipette were: 19.611, 19.711, 19.755, 19.924 and 20.042 mL. Calculate the uncertainty (1/2 range) of the data. Please report an answer accurate to three decimal places. Report your answer in mL, do not use Scientific notation and do not include the units when entering your answer.

#### Solution

The volumes measured are: 19.611 mL, 19.711 mL, 19.755 mL, 19.924 mL, 20.042 mL

The range of these measurement is:  $20.042 - 19.611 = 0.431$  mL

The absolute uncertainty is half of this:  $\frac{0.431 \text{ mL}}{2} = 0.2155 \text{ mL} = 0.216 \text{ mL}$  (rounding to 3dp)

The average of these measurements is  $\frac{19.611 + 19.711 + 19.755 + 19.924 + 20.042}{5} = 19.8086 \text{ mL} = 19.809 \text{ mL}$  (rounding to 3dp, the same as an uncertainty)

Complete value with absolute uncertainty is: Volume =  $19.809 \pm 0.216$  mL

The answer is: 0.216

**Answer: 0.216**

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