Checking a Meter Between Two Reference Points

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A workshop checks a meter that reports dissolved marker concentration. It must read within 0.25 mg/L of the true value at every concentration used. The workshop first checks low and high standards, then adds a middle standard measured independently.

Standard	Known concentration (mg/L)	Meter reading (mg/L)
Low	4	4
Middle	8	9
High	12	12

1 Which standard directly shows a reading outside the stated tolerance?

(1) Low only

(2) Middle only

(3) High only

(4) All three

2 A student approves the meter after testing only the low and high standards. Evaluate the approval with the middle reading. [1]

Answer and work

The workshop makes a fourth sample by mixing equal volumes of the low and high standards. The dissolved marker is conserved and the liquid volumes add. The meter reads 9 mg/L for the mixed sample.

3 Calculate the true concentration of the mixed sample. Decide whether the new reading meets the tolerance. [1]

Answer and work

4 The technician proposes that only the independently prepared middle standard was mixed incorrectly. Use the mixed sample to evaluate that explanation. [1]

Answer and work