Checking a Humidity Reading After a Reversal

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

A museum tests a humidity sensor for a display case. It runs two model tests that reach the same reference humidity levels. In one test humidity rises steadily and in the other it falls steadily. The sensor display is read after the same settling time at each level.

Reference humidity (%)	Reading while rising (%)	Reading while falling (%)
35	34	36
45	42	48
55	54	56

1 At which reference level does the direction of change produce the largest difference in readings?

(1) 35%

(2) 45%

(3) 55%

(4) The difference is the same at all levels.

2 Evaluate the claim that the sensor can be corrected by adding the same amount to every reading. [1]

Answer and work

The museum considers a second sensor. Its manufacturer claims the reading at 45% does not depend on whether humidity was rising or falling.

3 Describe two runs that approach 45% humidity from opposite directions. State one variable to keep the same and which result would support the manufacturer’s claim. [1]

Answer and work

4 Suppose both new readings are 43%. Explain whether that supports the claim and whether the readings are accurate at 45%. [1]

Answer and work