Checking a Dye Test With a Known Addition

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

A studio measures a dissolved dye in two model rinse liquids. For each liquid, the detector response is proportional to the dye amount, but the proportionality factor can differ between liquids. Zero dye gives zero signal. A test adds two known dye units to each sample without otherwise changing the liquid.

Liquid	Signal before addition	Signal after adding two units
P	6	10
Q	6	8

1 Which sample’s signal changes more when two dye units are added?

(1) P only

(2) Q only

(3) Both change equally.

(4) Neither changes.

2 Calculate the signal per dye unit for each liquid from the known addition. [1]

Answer and work

3 A student uses the two equal starting signals to report equal dye amounts. Find the starting amounts and evaluate the claim. [1]

Answer and work

A third sample is made in liquid Q under the same conditions. Its detector signal is five before the addition.

4 Predict its signal after the same addition. Explain which part of the earlier record applies. [1]

Answer and work