Separating Two Effects on an Initial Rate

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

A reaction simulation uses dissolved reactants R and S. Each trial is at the same temperature and total volume. The display measures the initial rate of product formation before either reactant is used up appreciably.

Trial	R concentration (model units)	S concentration (model units)	Initial rate (product units/s)
A	1	1	4
B	2	1	8
C	1	2	16
D	2	2	32

1 Which pair isolates the effect of changing S while R remains at 2 model units?

(1) A and B

(2) A and C

(3) B and C

(4) B and D

2 Use A, B, and C to compare the observed effect of doubling R with that of doubling S. [1]

Answer and work

3 A student says A and D alone prove that S has a greater effect than R. Select whether the comparison supports or refutes that claim, and explain. [1]

Select one

☐ Supports the claim

☐ Refutes the claim

Answer and work

The class adds a trial E with R at 4 units and S at 1 unit. It predicts that each doubling of R has the same effect while S is fixed at 1.

4 Predict the initial rate for E under that hypothesis. Explain which existing pair supports the prediction. [1]

Answer and work