

Solutions

Authored self-check guidance: accept equivalent correct methods and supported interpretations. The points check reasoning, not an official grade.

2.1 D – Temperature rises 4°C over two minutes. A gives the total temperature increase without dividing by two minutes; B confuses a different increment with this interval's rate; C uses final temperature as a rate.

Correct response linked to the given case.

2.2 A – Successive equal-duration increments are 8, 6 and 4°C . B contradicts increasing measurements; C contradicts unequal increments; D contradicts the actual 38°C at six minutes.

Correct response linked to the given case.

2.3 36 – The midpoint of the interval uses half the 4°C rise.

Correct response linked to the given case.

2.4 False – It is extrapolation and needs stronger assumptions.

Correct response linked to the given case.

3.1 $r_1 = (28 - 22)/2 = 3$, $r_2 = (32 - 28)/2 = 2$, $r_3 = (34 - 32)/2 = 1$, all in $^{\circ}\text{C}/\text{min}$. Temperature rises throughout, while these interval-average rates decrease. This does not specify every instantaneous rate.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence. Accurate conditions, checks or qualification.

3.2 $T(3) = 28^{\circ}\text{C} + [(3 - 2)/(4 - 2)](32 - 28)^{\circ}\text{C} = 30^{\circ}\text{C}$. First-slope model gives $T(6) = 22^{\circ}\text{C} + (3^{\circ}\text{C}/\text{min})(6 \text{ min}) = 40^{\circ}\text{C}$, above the observed 34°C . Constant early rate is inconsistent with the whole series.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence. Accurate conditions, checks or qualification.

3.3 It is extrapolated beyond 0–6 minutes. A rising curve can flatten, and the measured average rates already decline. Predicting minute 12 needs a stated model and additional evidence; temperature direction alone does not fix rate or long-term behaviour.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence. Accurate conditions, checks or qualification.