PHYSICS

1. Acceleration:
$$a = \frac{v - u}{t} = \frac{25 - 5}{5} = \frac{20}{5} = 4 \text{ m/s}^2.$$
Tip: keep signs (v − u) consistent.

2. v–t graph for uniform acceleration from rest:

Straight line starting at origin with slope = acceleration (here slope = 4). Area under line = displacement.

Tip: draw line, mark slope and axes — boards like clean labels.

3. Relative velocity:
$$v_{A/B} = v_A - v_B = 20 - 15 = 5 \text{ m/s}.$$
$$v_{B/A} = v_B - v_A = 15 - 20 = -5 \text{ m/s} \text{ (i.e. B moves at 5 m/s opposite to A)}.$$
Tip: use $v_{X/Y} = v_X - v_Y$; sign gives direction.

CHEMISTRY

4. Empirical formula from % (assume 100 g):

C: $40/12 = 3.333$ mol, H: $6.67/1 = 6.67$ mol, O: $53.33/16 = 3.333$ mol.

Divide by smallest (3.333) → C:1, H:2, O:1 → **CH_2O**.

Tip: assume 100 g, convert to moles, then divide by smallest.

5. Molecular formula from empirical CH_2O, M(emp)=30 g/mol, M(actual)=180 g/mol → factor $= 180/30 = 6$.

Molecular formula = **$C_6H_{12}O_6$**.

Tip: always compute empirical mass carefully.

6. Combustion stoichiometry:

Balanced: CH_4 + 2 O_2 → CO_2 + 2 H_2O. So 1 mole CH_4 needs 2 moles O_2.

For 5 moles CH_4 → **10 moles O_2** required.

Tip: balance first, then use mole ratios.

MATHEMATICS

7. Quadratic with sum = 5 and product = 6:

$$x^2 - (\text{sum})x + (\text{product}) = 0 \Rightarrow x^2 - 5x + 6 = 0.$$

8. Vertex of $y = 2x^2 - 8x + 3$:

$$x_v = -\frac{b}{2a} = -\frac{-8}{2 \cdot 2} = 2.$$
$$y_v = 2(2)^2 - 8(2) + 3 = 8 - 16 + 3 = -5.$$

Vertex = **(2, −5)**.

Tip: compute x first, then plug in for y.

9. Solve $x^2 - 5x + 6 < 0$:

Factor: $(x - 2)(x - 3) < 0$. So solution is $2 < x < 3$ (values between roots).

Tip: for $a > 0$ quadratic <0 between roots.

GENERAL / SELF-REVIEW (Q10)

You were asked to list top 2 weak points. **What I expect / suggest you write** (examples + action steps):

Example weaknesses (good answers):

1. *Graph interpretation (v–t, x–t):* sometimes confuse slope vs area.
   Fix: draw axes, label slope = derivative, area = integral; practice 5 graphs/day.
2. *Stoichiometry setup:* sometimes use masses instead of mol ratios.
   Fix: always convert mass → moles first; write balanced equation and mole table.

How to write yours: short, specific, and actionable — e.g.

- *Weak point 1:* confuse sign in relative velocity → practice 10 signed-velocity problems.
- *Weak point 2:* slow at empirical formula questions → do 8 %→empirical problems in 15 min.