The Problem-Solving Pathway

What is the problem with the problem-solving questions?

Shared reflections from former students of Eoghan O'Leary

1. There's a lot happening at once
These questions are long and multi-step. You have to read carefully, pick out key information, choose methods, and keep track of the goal. It's easy to feel overloaded.
2. The wording can be confusing
It can feel like a reading test as well as a maths one.
3. The maths looks unfamiliar
You might know the skills, but wrapped in a story, Ferris wheels, loans, cooling drinks, it feels new. The trick is spotting the maths hiding inside the context.
4. They mix topics together
These questions often blend areas like trigonometry with calculus or probability with statistics. If you've only practised topics separately, the combination can be challenging.
5. They take time and add pressure
They usually appear near the end of the paper when tiredness and time pressure kick in. Stress can make your mind freeze even when you know the maths.
6. It's unclear what earns marks
Students think if they can't finish, there's no point starting. But diagrams, formulae, etc all earn marks.
7. Confidence matters
Many assume these questions are only for "top students." Not true. Staying calm, starting small, and working line-by-line makes them manageable.
8. You don't get enough practice
Most school tests focus on short Section A questions, so students rarely see long, real-world problems until mocks or the exam. With practice, they get far easier.

If it's so obvious why don't we change the way students prepare for the exam?

As teachers, we know that problem-solving questions account for **50%** of the marks, and that **regular practice** is the only way students improve. So why don't we spend more time on them in class? There are two honest reasons:
1. The pressure to "cover everything" in Section A is intense.
Those skills take time to teach, revise, and retest and they can easily fill every available class period before we ever reach the bigger, messier questions. As teachers we want to teach all skills on the course.
2. Problem-solving questions are inherently harder to practice in class or for homework.
They blend topics, place a heavy load on working memory, and can push students into **cognitive overload**, where they freeze, shut down, or convince themselves they can't do it at all. "I'm stuck on the first part".

The result?
Students arrive at their Pre-Exams, and even the Leaving Cert itself, underprepared **for the most important section of the exam**. They underperform because they lack exposure.

Preparing for the Driving Test Vs preparing for the Leaving Cert Maths Exam

1. Know What's Being Assessed: Prepare With the End in Mind
Driving Test: Most fails come from poor Observation & Awareness.
Leaving Cert Maths: 50% of marks are for problem-solving; only 5% are for complex numbers.
Everything is important, but keep in mind what is most important.

2. Learn the Theory: But Start "Driving" Quickly
Driving Test: Learning road signs doesn't make you a good driver — driving does.
Leaving Cert Maths: Students improve by doing maths, not by just observing it.
Theory = the starting point. Practice = progress

3. Build Skills Gradually and Purposefully
Driving Test: Start in quiet car parks, then progress to busier roads.
Leaving Cert Maths: Begin with structured, scaffolded problems; then mix topics and raise difficulty
Progressive challenge builds confidence.

4. Combine Guidance and Independence
Driving Test: Instructor lessons give feedback; independent practice builds confidence.
Leaving Cert Maths: Teacher guidance + student independence = long-term competence.
Students need space to make mistakes and learn from them.

5. Simulate the Real Test Early- Then Reflect
Driving Test: Mock tests mimic pressure and conditions.
Leaving Cert Maths: Timed past papers and mixed-topic questions simulate real exam conditions.
You perform how you practice, students who only rehearse drills struggle in heavy traffic.

6. Build Calmness and Confidence
Driving Test: Composure is crucial; panic causes errors.
Leaving Cert Maths: Calm students recover marks even when stuck.
Confidence comes from familiarity, and familiarity comes from practice.

7. The Key Message
Driving Test: You pass your driving by applying the rules while on the road.
Leaving Cert Maths: You don't get a H1 in Maths by knowing the syllabus, you get it by using it to solve problems under pressure. Give students the wheel early. Let them steer, let them stall, that's how they learn.

8. Why **Applied Maths students** have such an advantage

- Applied Maths is extra time "on the road." Every problem requires students to, interpret real situations, model them mathematically and then check if the solution makes sense. They practice the exact skills worth 50% of HL Maths every week. By exam day, they're experienced drivers; others are still leaning to parallel park.

So, what can we do?

One of the best ways I've found to prepare students for **Higher Level Section B** questions is to **begin with Ordinary Level Section B** questions and then progress to similar, more challenging **HL** versions.

OL Section B questions are not "empty car parks" where students practise isolated skills without pressure. They're more like **straight roads, quiet roundabouts, and wide three-point turns**, controlled environments that are still realistic, structured, and meaningful, but **not overwhelming**. Students can develop the essential habits:

- reading the context,
- building a structure,
- choosing the right maths,
- and progressing line by line.

All of this happens **without tipping them into cognitive overload**. Once those habits are in place, students are far better equipped to handle the full HL questions. Their confidence rises, their working memory stays calmer, and the problems feel **familiar rather than frightening**. When we try this, very quickly, you'll see why it works, and why students respond so well to it.

"If you don't know what to do, do what you know."

A philosophy for problem-solving in maths and beyond: Eoghan O'Leary

I have been saying this sentence for over 20 years and its amazing how many students quote it back to me when I meet them somewhere. It's the antidote to overwhelm, the starting point when working memory is overloaded, and the bridge between Section A and Section B.

1. Reduces overwhelm and builds momentum
Students say this mindset helps them stay calm in exams and overcome the panic feeling. By starting with something familiar, a formula, a definition, or a first step, they 'get the ball rolling' and think more clearly.

2. Encourages partial progress and partial credit
Instead of leaving blanks, students wrote what they knew, often earning partial marks or working their way to the full solution. It rewards effort and logical thinking, even when the full answer isn't clear yet.

3. Promotes structured problem-solving
They use it to break complex, multi-part questions into manageable pieces. Doing the parts they understand first helps them find links and patterns that reveal the rest.

4. Transfers beyond maths
When I meet past pupils of mine the tell me they use this same approach in college and careers, in subjects like chemistry, law, accountancy, physiotherapy, pharmacy, and engineering, applying it to real-world challenges and decision-making.

5. Builds confidence and persistence
By focusing on what they can do, students stay productive and positive. Writing down even a small piece of what they know often leads to insight and momentum, turning uncertainty into understanding.

"This philosophy has helped me feel less overwhelmed, earn extra marks, and approach challenges with more confidence, not just in maths, but in life." Former student