> “Algebra’s like sheet music, the important thing isn’t can you read music, it’s can you hear it”

Our training teaches students to grapple with Math intuitively and predictively instead of simply just reading and reacting

Integrated Programme Mathematics Y1-Y4

Y1:

This is a table of comparison for Express and IP Math for Y1. Bolded are the topics unique to IP

Mainstream (Express)	Integrated Programme
Numbers and their Operations (Prime factorization, HCF/LCM, number line)	Numbers and their Operations (Prime factorization, HCF/LCM, number line, use of **standard form**)
Ratio	Ratio (**Map Scales, Inverse and Direct proportion, forming proportionality equations and solving**)
Percentage	**Financial Mathematics (basic and compound interest)**
Rate and speed	Rate and speed (**conversion of units, rates of change**)
Algebraic Expression and formulae	Algebraic Expression and formulae
Functions and graphs	Functions and graphs (**in relation to equations**)
Equations and inequalities (linear equations, fractional equations)	Equations and inequalities (linear equations, fractional equations, **solving of inequalities**)
Angles, Triangles and Polygons	Angles, Triangles and Polygons
Mensuration 2D	Mensuration 2D
Statistics (tables, bar graphs, pictograms, line equation, pie chart)	Statistics (tables, bar graphs, pictograms, line equation, pie chart)

Y2:

This is a table of comparison for Express and IP Math for Y2. Bolded are the topics unique to IP

Mainstream (Express)	Integrated Programme
Ratio and proportion (map scales and proportions)	**Changing subject of the formula**
Functions and graphs	Functions and graphs (**sketching of quadratic graphs**)
Simultaneous equations	Simultaneous equations (**in relation to quadratic equations**)
Congruence and similarity	Congruence and similarity (**with trigonometric ratios**)
Pythagoras theorem and trigonometry	Pythagoras theorem and trigonometry (**ratio of obtuse angles**)
Mensuration 3D	Mensuration 3D (**with trigo, similarity, and congruence**)
Data handling and analysis (diagrams, mean, mode, median)	Data handling and analysis (diagrams, mean, mode, median,** Probability, interquartile range**)
	Introduction to Indices and standard form

Y3 to Y4:

This is a table of comparison for Express and IP Math for Y3-Y4. Bolded are the key differences in exam format and questions

E-Math	A-Math	IP Math 1 and 2
Paper 1 (2h) weightage 50%	Paper 1 (2h) weightage 44%	**Paper 1 (1.5h-2h) weightage 50%**
Paper 2 (2.5h) weightage 50%	Paper 2 (2.5h) weightage 56%	**Paper 2 (2h-2.5) weightage 50%**
Uses E-math formula sheet	Uses A-math formula sheet	Combined** formula sheet provided**
No binomial theorem	No matrices	**All topics tested**
No surds and logarithms	No statistics	All topics tested
No calculus	No set notation	All topics tested
No further trigonometry and kinematics		**Several questions adapted from *H1/H2 syllabus*, including recurrence relation or summation style questions**

How do we address this difference in our classes? By prioritizing efficiency

1. Students complain of a lack of time to complete the paper and do necessary checks even after long hours of study
2. Questions are designed to be heavy in critical thinking and pattern recognition instead of completing using a longer method
3. Hard working students often blindly work at the solution instead of noticing certain prompts in the numbers or question that hint towards the best method
4. Textbook recommended methods are blind application, we focus on live application that adapts to the situation

The question below is a typical two marks Math question set by National Junior College in their secondary 2 exam. Note the differences between the recommended approach versus typical approach, appropriately named as good and bad. In the bad example, textbook expansion principles are used and no solution is found despite simplifying the equation. In the good example, pattern recognition and critical thinking is used to arrive at the final answer via factorization

NJC JH2/IPY2 Math:

Solve the following equation:

$$7(x-3)(x+4) = -4(x+4)$$

BAD

$$7(x^2+4x-3x-12) = -4x-16$$

$$7(x^2+x-12)+4x+16 = 0$$

$$7x^2+7x-84+4x+16 = 0$$

$$7x^2+11x-68 = 0$$

Tough to solve!

GOOD

$$7(x-3)(x+4)+4(x+4)=0$$

$$(x+4)[7(x-3)+4(1)]=0$$

$$(x+4)(7x-21+4)=0$$

$$(x+4)(7x-17)=0$$

From which $x=-4$ or $x=17/7$.

Common Pitfalls in IP Y1-Y4 Math:

Students who have done well in PSLE math may show an over-reliance on PSLE style, open ended techniques which are designed to solve problem sums, but not secondary level questions.

Secondary level questions focus on laws, procedure, equations, and discipline, especially for Integrated Programme students who contend with multi-topic or interdisciplinary questions at the final year exam.

Students need to memorize specific equations, master specific laws, and apply them in the right context, at the same time also using algebraic manipulation to simplify the question.

Unlike the O-level, IP Y3-Y4 math is packaged as a single subject, but its weightage is equal to two subjects. This gives the students overconfidence, underestimating the workload of the math subject, and dedicating too little time for it until it is too late.

IP brings down content from the upper levels, meaning Y1Y2s are tested on certain O-level concepts, and Y3Y4s are tested on certain A-level concepts.

Mastery of maths at Y3/Y4 also has a DIRECT CORRELATION WITH COMPETENCY IN YOUR SCIENCES. Physics, Chemistry and Biology, and Computer Studies at the IP level often have their difficulties bolstered by the addition of complex math concepts, be it calculus for rates of changes and graphs, or trigonometry in periodic patterns.