



Mathematics Faculty

P & C presentation – Term 1, 2022

Overview

- Faculty Vision
- Transformative Learning in Mathematics
- Meeting the needs of all students
- Acceleration in Mathematics
- Selecting the right course in Stage 6

Faculty Vision

To provide a safe environment, where every student is known, valued, and supported. Where students develop their creative and collaborative skills as well as becoming resilient, confident, lifelong learners, setting realistic goals and having the intrinsic desire to achieve them.

We believe

- Teaching is dynamic and collaborative
- All students can improve
- Creativity is built upon a foundation
- Teachers need pedagogical autonomy
- Students can become independent learners
- Creative thinking and deep understanding are as important as skills

We Value

- Positive and supportive relationships
- An environment where every member strives to do their best
- Equity in educational opportunities
- Innovative thinking and problem solving
- Innovative and flexible teaching practices

We will see

- Happy and Engaged students
- Enhanced collaborative problem solving skills
- An increase in the number of students with capacity to complete the Extension 1 and 2 courses
- An increased sense of belonging in the mathematics class
- Increased self-confidence and class participation by students

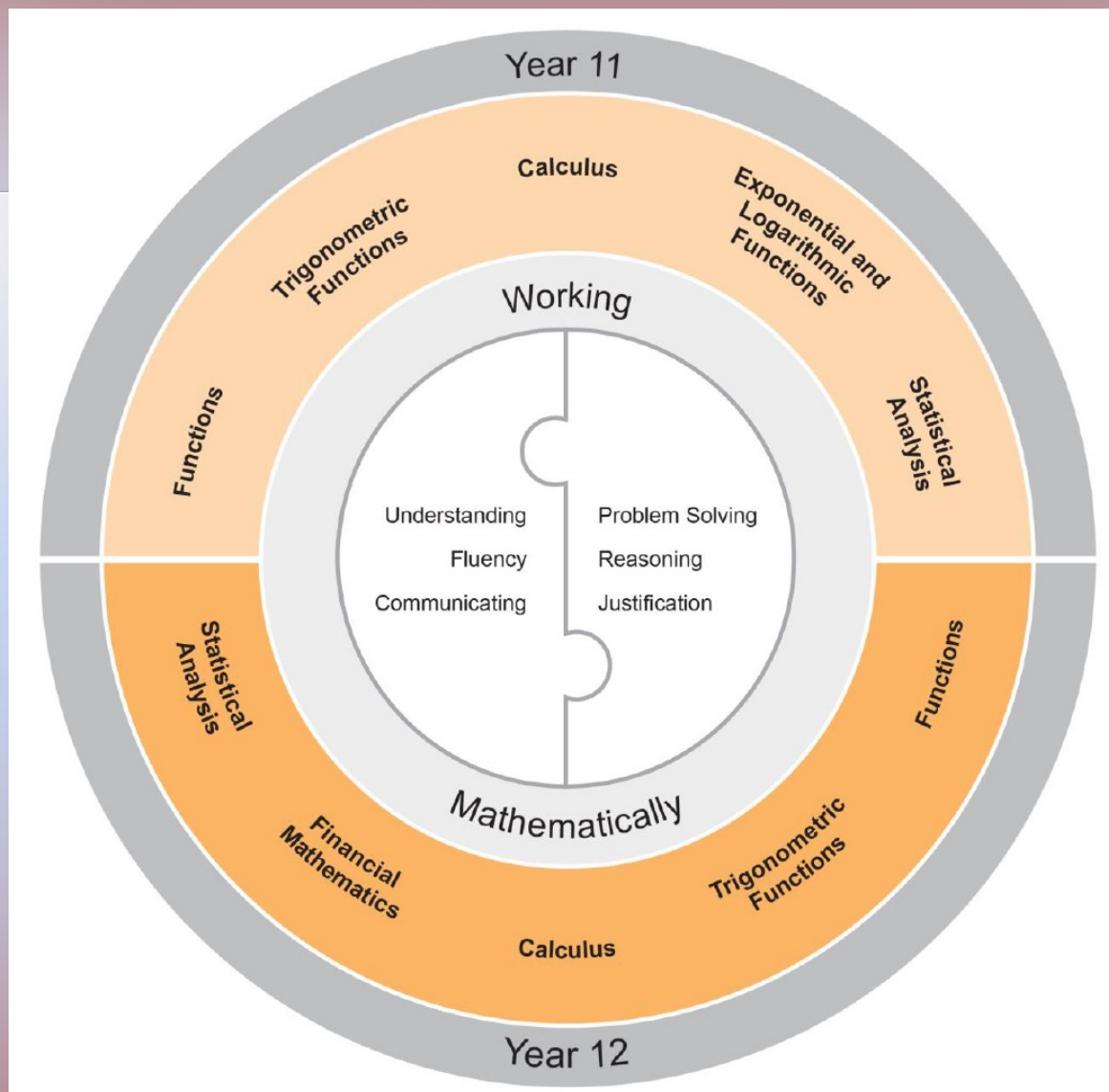
From the Syllabus

The aim of the junior syllabus is for students to:

- be confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens
- develop an increasingly sophisticated understanding of mathematical concepts and fluency with mathematical processes, and be able to pose and solve problems and reason in Number and Algebra, Measurement and Geometry, and Statistics and Probability
- recognise connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible, enjoyable discipline to study, and an important aspect of lifelong learning.

From the Syllabus

**Stage 6
Mathematics
Advanced**



From the Syllabus



Transformative Learning in a Mathematics And Learning Dispositions of Successful Learners

Intrapersonal

FOCUS Self-controlled and confident

GRIT De

CURIOS

Cognition

THINK WHY AND HOW Poses questions and solves problems

MAKE AND EXPRESS

BUILD NEW IDEAS Ex

Interpersonal

INFLUENCE Shows initiative and responsibility

EMPATHY Understands and acts for others

TEAMWORK Co-constructs and commits to the group

Learning Dispositions

The how:

Creativity

- Noticing.
- Asking why? Really why?
- Playing with possibilities.
- Selecting and evaluating.

Learning Dispositions

The how:

Critical Reflection

- identify assumptions.
- why this? why so?
- contesting, elaborating and adopting.
- re-solving.

Learning Dispositions

The how:

Communication

- alert to messaging.
- enabling voice.
- conveying meaning and purpose.
- generating action and agency.

Learning Dispositions

The how:

Collaboration

- Offering - yielding - challenging - evaluating and extending.
- advancing.
- co-constructions and connections.

What does it look like in a Mathematics classroom

1. Start with a question/problem
2. Students need time to struggle
3. The teacher is not the answer key
4. Say YES to student's ideas
5. Play

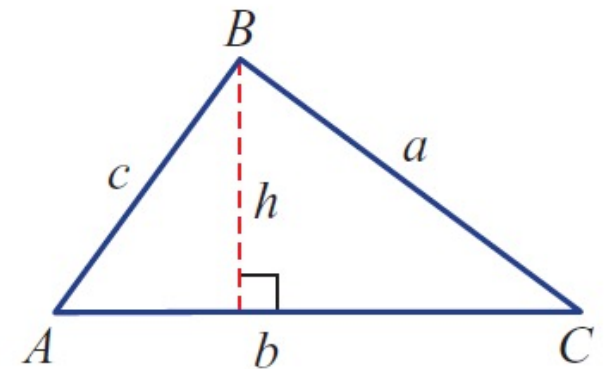
Example – A typical traditional maths lesson

Area of a triangle

We can use trigonometry to establish a rule for the area of a triangle using two sides and the included angle.

We can see in this triangle that $\frac{h}{a} = \sin C$, so $h = a \sin C$.

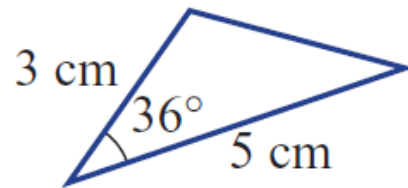
$$\therefore A = \frac{1}{2}bh \text{ becomes } A = \frac{1}{2}ba \sin C.$$



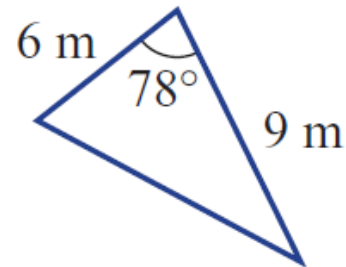
Example – A typical traditional maths lesson

4 Find the area of these triangles, correct to 1 decimal place.

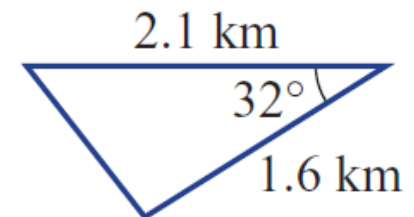
a



b



c



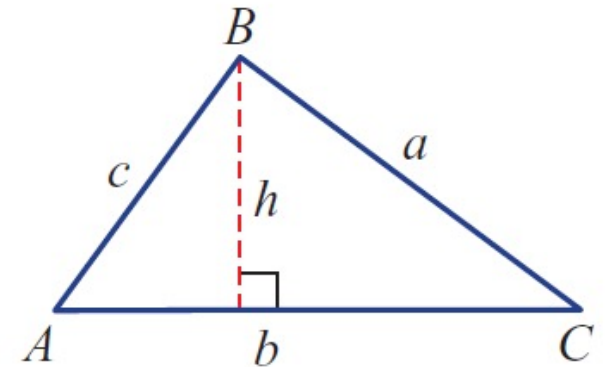
Example – A new strategy

Area of a triangle

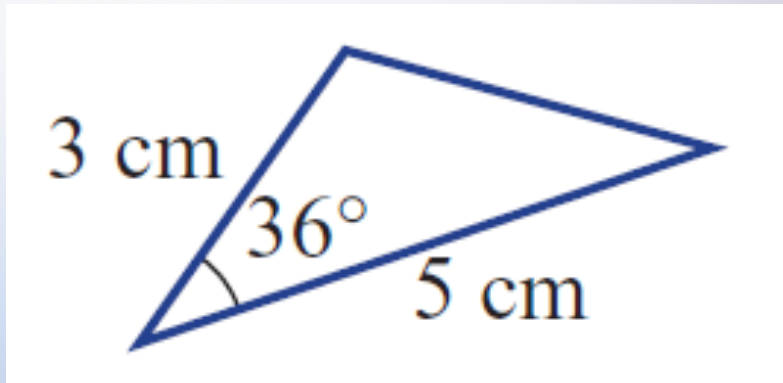
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Example – A new strategy



What is the area of this triangle?

You **can not** use the formula: $A = \frac{1}{2}ba \sin C.$

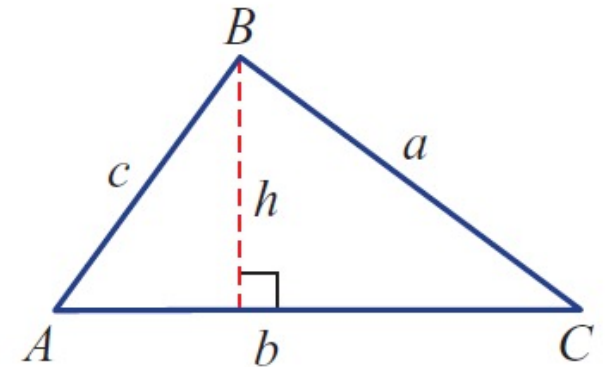
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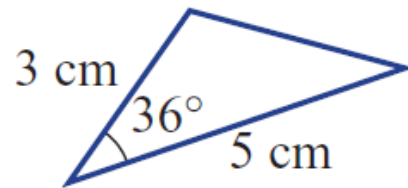
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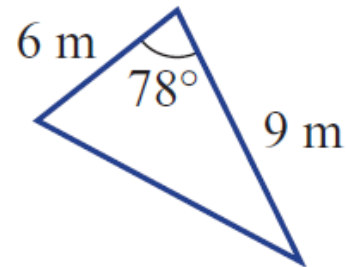
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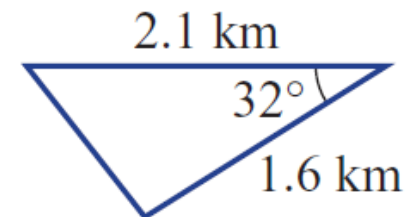
a



b



c



Year 10 Mathematics



Year 10 Mathematics



Year 10 Mathematics



Year 10 Mathematics

07.03.22

Problem Solving Framework

- Read - language? *- more than once.*
- what is question asking

- Diagrams

- marked measurements, dimensions, properties

- Need to simplify
- Questioning?
 - Agreed as a group
- Use knowledge of other areas of maths related to issue.

- Strategy - diagram → triangles
↓
hints in the question info not used

- Breaking down the steps → smaller steps

- Algebra

- Explored & evaluated different approaches
↳ as group brainstormed.

- Resilience
↳ together then separate

- Work backwards

1. 15 mins. to attempt & solve the question
2. In each group one person to observe and take notes

2. Discuss as a group observations and any comments.
3. As a class - develop framework for problem solving.

Meeting the needs of all students

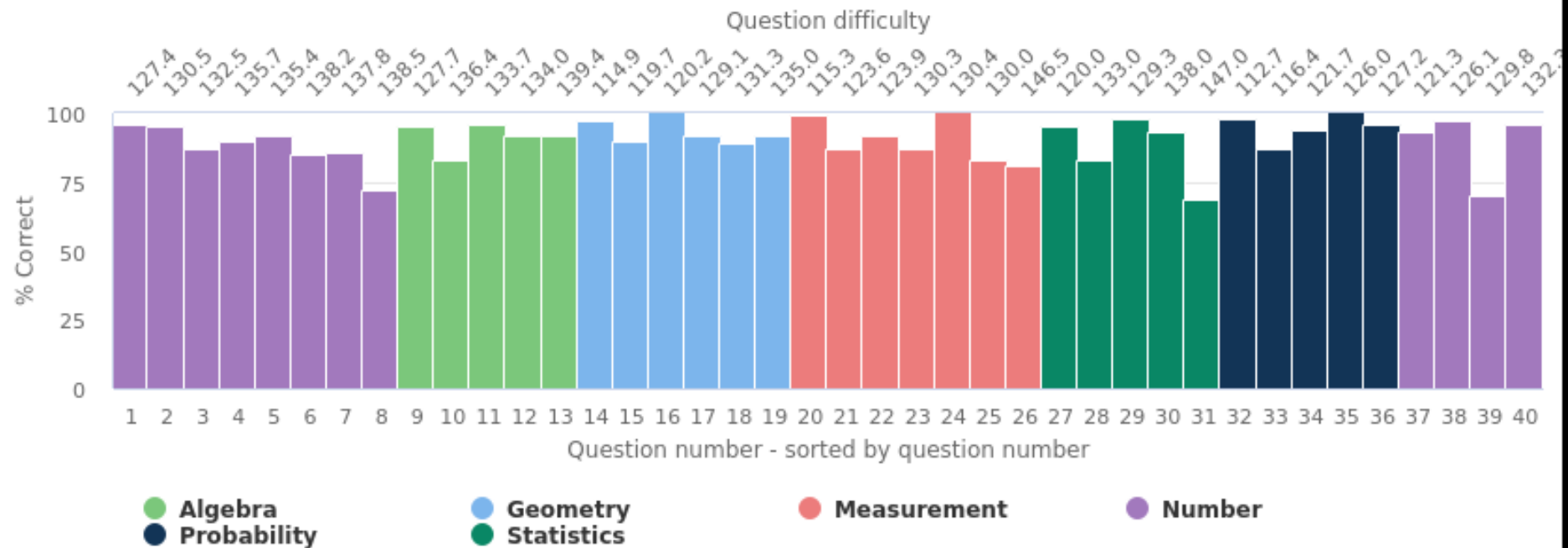
- Identifying students requiring support in Numeracy
 - Using PAT MATHS Test
 - Standardised test
 - Covering NSW curriculum
 - 40 questions
 - No time limit

Identifying students requiring support in Numeracy early



PAT Maths 4th Edition / Group Report / PAT Maths Test 7 - Question Performance

for students with year level Year 7 between 07-02-2022 and 08-03-2022



Identifying students requiring support in Numeracy early

				Question difficulty	127.4	130.5	132.5	135.7	135.4	138.2	137.8	138.5	127.7	136.4	133.7	134.0	139.4	114.9	119.7	120.2	129.1	131.3	135.0	115.3	123.6	123.9	130.3
				Strand	N	N	N	N	N	N	N	N	A	A	A	A	A	G	G	G	G	G	G	M	M	M	M
				Percentage correct within this group	96%	95%	87%	90%	92%	85%	86%	72%	95%	83%	96%	92%	92%	97%	90%	100%	92%	89%	92%	99%	87%	92%	87%
				Question number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Raw score	Scale score	Percentile ⓘ	Stanine ⓘ																								
40	179.0	99th	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
35	151.2	96th	8	✓	✓	✓	✓	✓	✓	✓	A	E	✓	✓	✓	✓	✓	✓	✓	✓	E	✓	✓	✓	✓	✓	✓
38	161.7	99th	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	C	✓
36	153.9	97th	9	✓	✓	C	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
37	157.2	98th	9	✓	✓	✓	✓	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
29	140.5	80th	7	✓	C	✓	C	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	B	✓	✓	✓	✓	A
30	141.9	83rd	7	✓	✓	✓	✓	✓	✓	✓	✓	C	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	B	C	✓
30	141.9	83rd	7	✓	✓	✓	✓	✓	✓	C	NA	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
30	141.9	83rd	7	✓	✓	✓	E	✓	✓	E	A	✓	✓	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
30	141.9	83rd	7	✓	✓	C	✓	D	✓	✓	A	E	✓	B	✓	✓	✓	✓	B	✓	E	✓	A	✓	✓	✓	✓
31	143.5	86th	7	✓	✓	✓	✓	D	✓	✓	B	✓	✓	✓	✓	✓	C	✓	B	✓	✓	B	✓	✓	B	✓	✓

Identifying students requiring support in Numeracy

Available support

- Homework Centre
- Learning Centre
- Modified/adjusted lesson practice
- Other support outside of lessons

Acceleration in Mathematics



Acceleration in Mathematics

Prior to 2021

- Start with 60 students in Year 9
- Reduce to 30 students in Year 10
- Reduce to 24 students in Year 11
- Finish with approximately 12 to 17 students at the end of Year 12

- Year 11 - complete the Advanced and Extension 1 course and sit for the HSC in both courses
- Year 12 - complete the Extension 2 course and sit for the HSC

Acceleration in Mathematics

Benefit of the program

- Inspire, motivate and meet the needs of highly capable students
- Reduced number of maths lessons in Year 12

Detriments of the program

- Students have to make a decision in Year 9 regarding their plans for Year 12
- Significant impact to the timetable in Year 10
- Accelerated students miss on a third elective
- Students who were not originally part of the program cannot participate
- Benefits a small percentage of the students
- Reduced face to face teaching in Year 12

Acceleration in Mathematics

From 2022

- Year 10 students are nominated by their teacher early Term 2.
- Students are invited to participate in the program from start of Year 11.
- New students joining the school at the start of Yar 11 could be considered (based on availability of placing).
- Not limited to one class.
- Year 11 - complete the Advance course and sit for the HSC
- Year 12 – complete the Extension 1 and Extension 2 courses and sit for the HSC

Acceleration in Mathematics

Benefit of the program

- No interruption to the Year 10 timetable
- All students can participate in three electives
- All students in Year 10 can work towards being nominated for the program
- Standard number of face to face teaching periods in Year 12

Detriments of the program

- Impact on ranking of Year 12 students
- Year 12 assessment complications
- Acceleration for Junior students