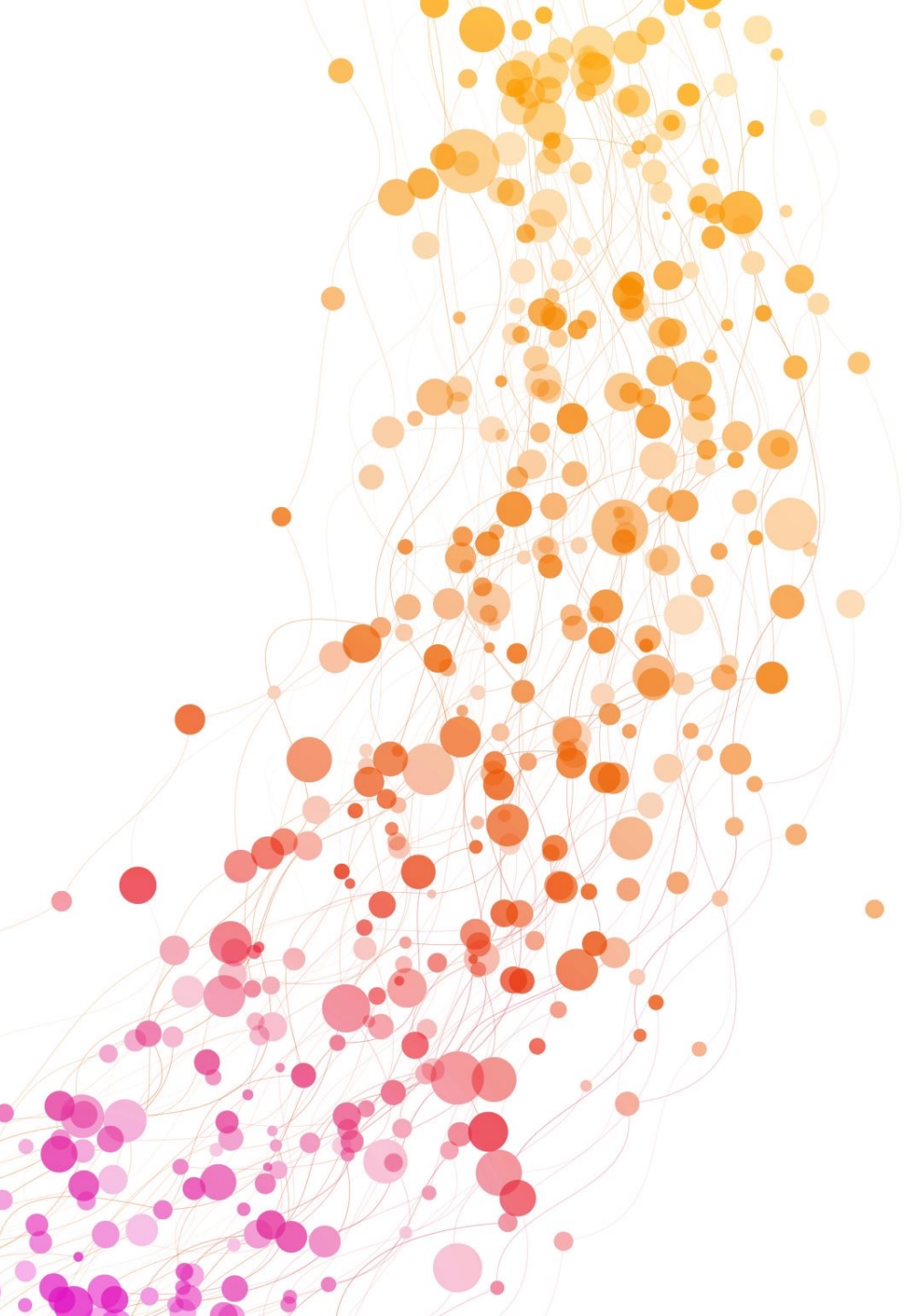




Maths for me, too!

Professor Rhonda Faragher

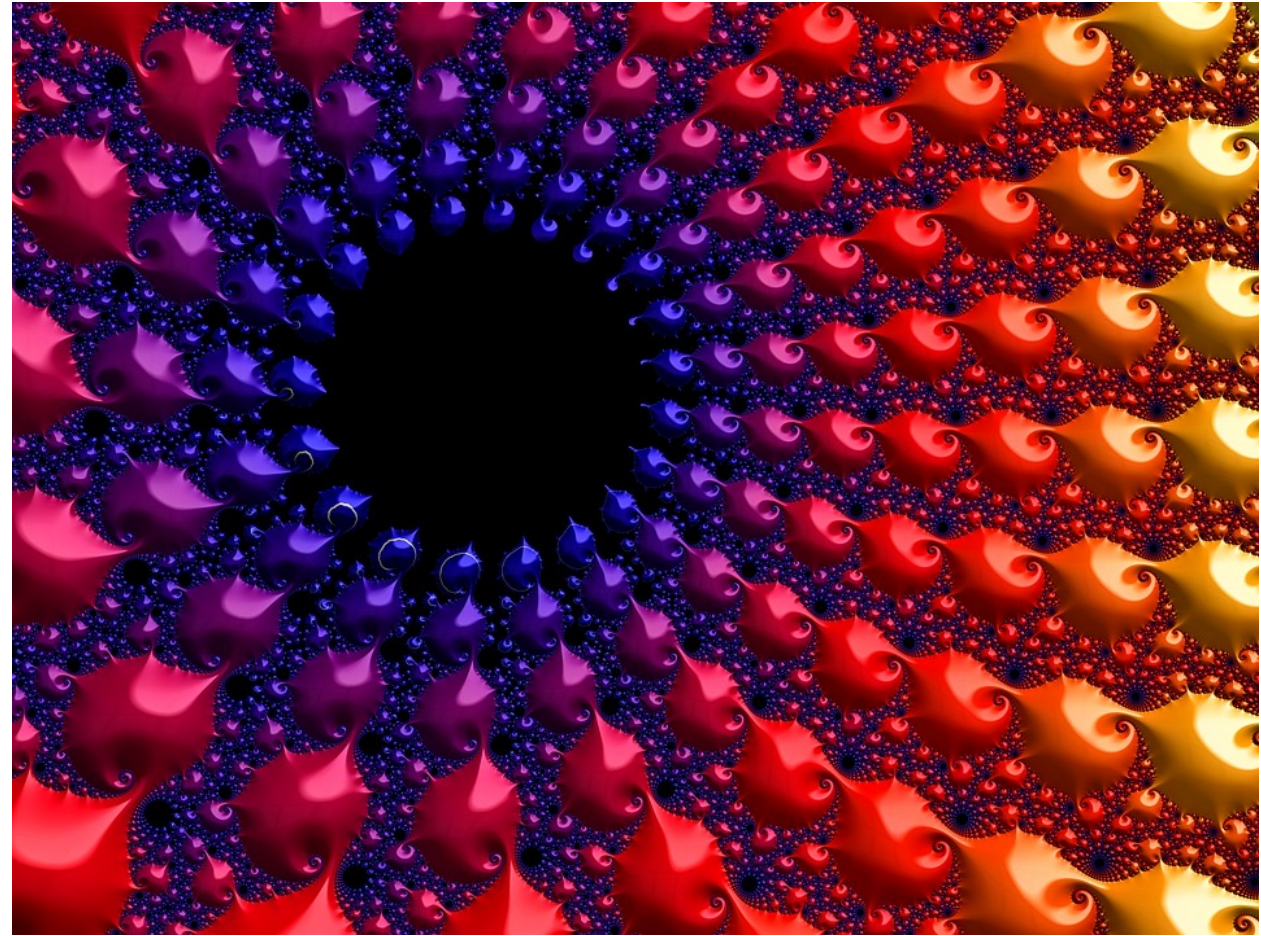
r.faragher@uq.edu.au

Today – where we are headed

- Checking in, warming up
- Raising expectations
 - what might be possible?
 - should we?
- Big ideas of maths – number, geometry, time, money
- Keeping going – mathematical thinking



Let's do some maths!



Tangrams



Tangrams



- What can you tell by looking?
- Is the top orange triangle as big as the green triangle? How do you know?
- Is the purple triangle the same as the black one? How do you know?

Problem Solving and Reasoning –
it's what we do!

“All children can learn mathematics and deserve the opportunity to do so.”

Today – where we are headed

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Raising expectations



What might be possible?

If you listen to most research ...

Not much!

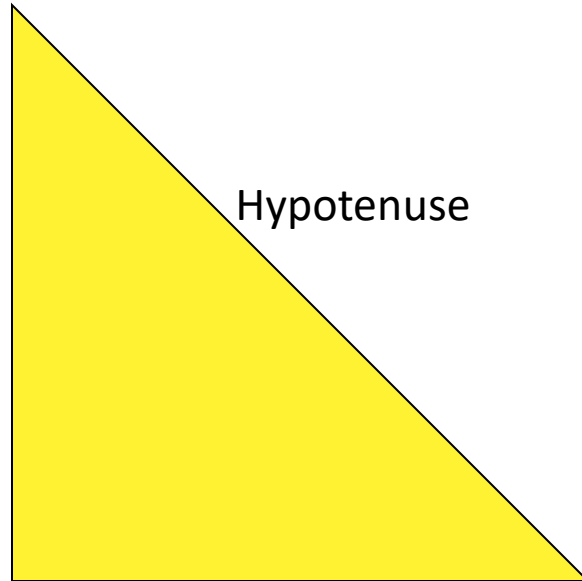
(Fortunately the story is changing)

Year level adjusted curriculum

Year level adjusted curriculum is about allowing kids to move past holes and *perhaps* fill them as they go.

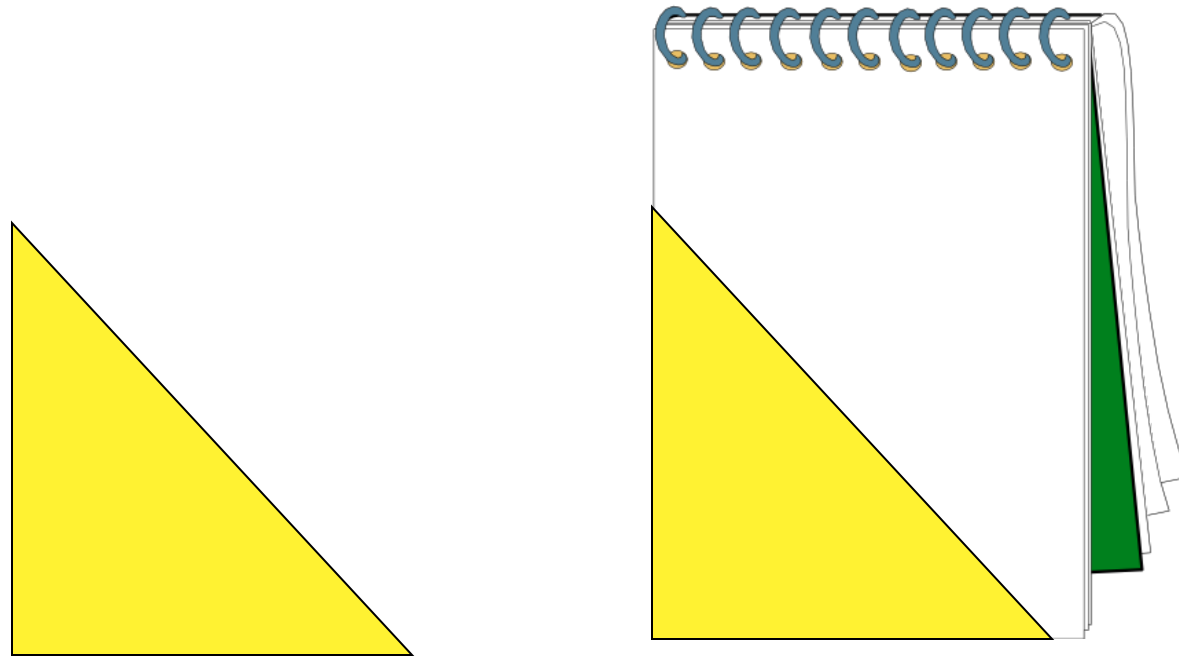


Example - Pythagorus' theorem



The square on the hypotenuse is equal to the sum of the squares on the other two sides.

Example - Pythagorus' theorem



... and on to trigonometry

- example of a task card

Sine ratio

Write down the rule:

Sine θ = Opposite side $\div$ hypotenuse side

Write in the numbers:

Sine θ = (___ $\div$ ___)

Use your calculator to work out the answer for Sine θ :

Use your calculator to find θ :

ANS Shift $\sin^{-1}$

Year level adjusted curriculum

- because it is the right thing to do

and

- some of the best teaching you will do!



Why bother?



- Have you needed to learn something new lately?
- Why?

...to improve Quality of Life

- A life of meaning and purpose
- A person can choose to improve their quality of life.

... and because times have changed



How times have changed...



Expect the best

Much is possible - FOR ALL!
... but how do we get there?



My maths research

1. Early maths development
Task based interviews with
primary aged children
2. Inclusive mathematics
education for learners with
Down syndrome
Primary school teaching teams
3. Secondary mathematics
4. Adult numeracy

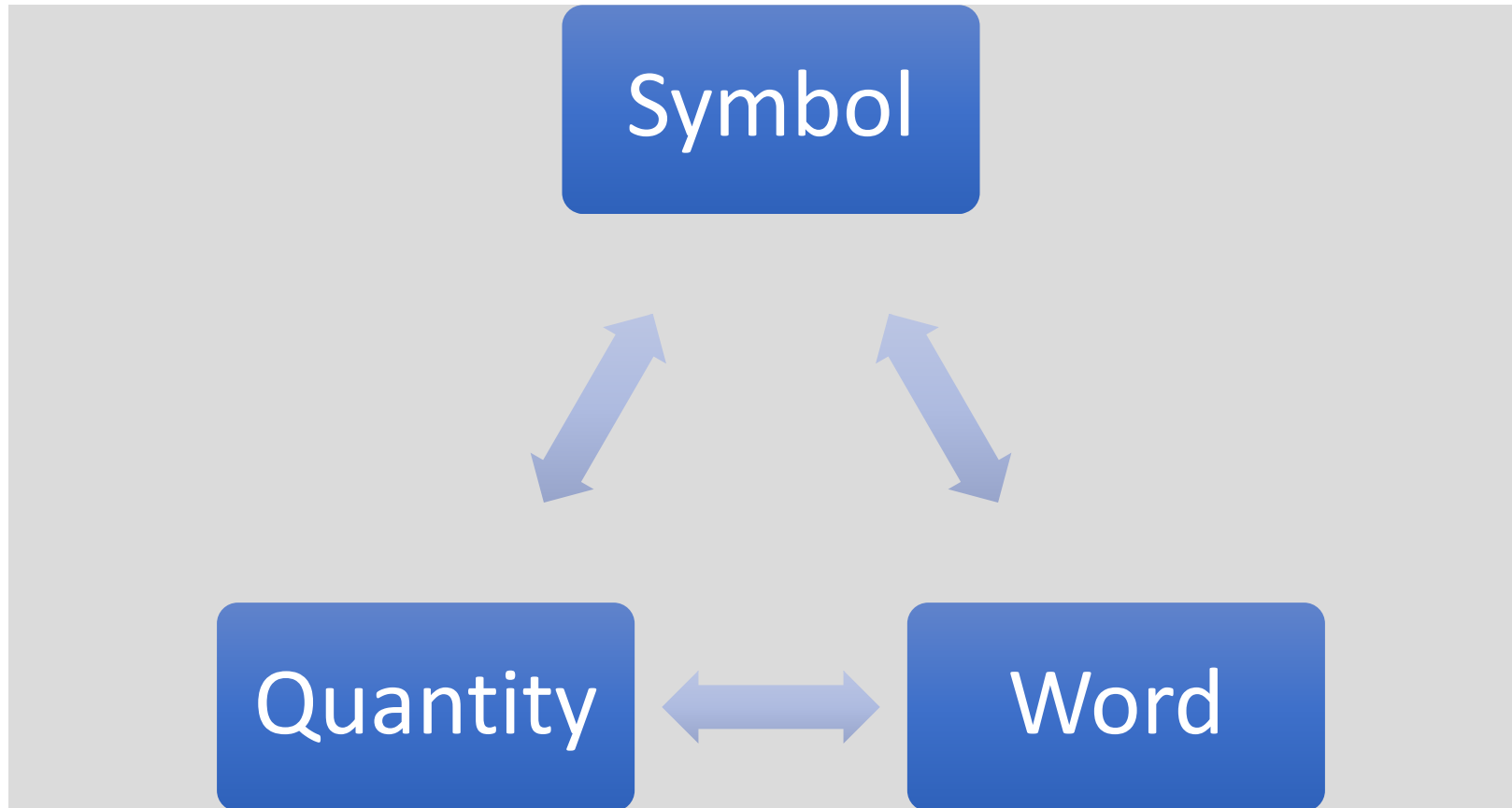
... so about number

You're a maths genius!

(and so are dogs, pigeons, horses,
elephants, rats...)



The concept of number



Problems with number



I can't do $25+2$ but
I can substitute
into algebraic
expressions

Problems with number

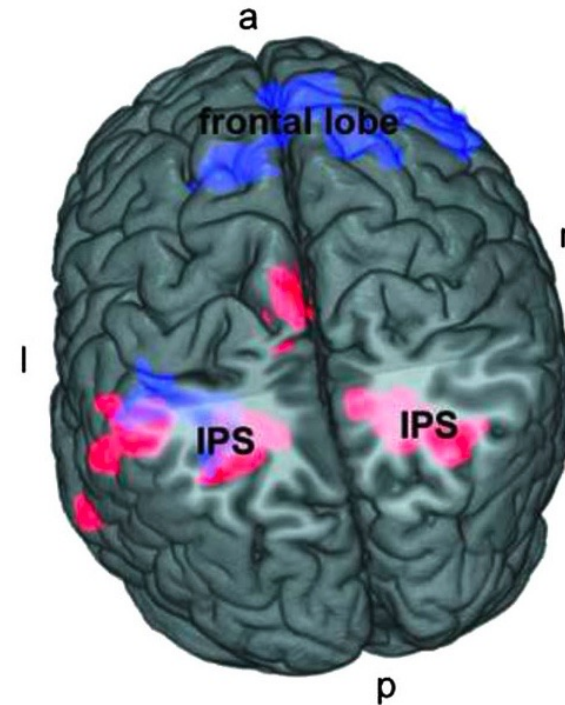
- well known
 - research
 - experience
- calculation is hard but understanding is possible

The good news ...
mathematics is more than
number!!



Could it be dyscalculia?

- Very specific deficit in number processing
- Other areas of mathematics are accessible



Kucian, K., & von Aster, M. (2015). Developmental dyscalculia. *European Journal of Pediatrics*, 174, 1-13. doi: 10.1007/s00431-014-2455-7

Calculator

- a powerful prosthetic device



Teach how to use a calculator!

Not allowing learners
with Down syndrome
to use a calculator is
like forbidding a short-
sighted person from
wearing glasses!



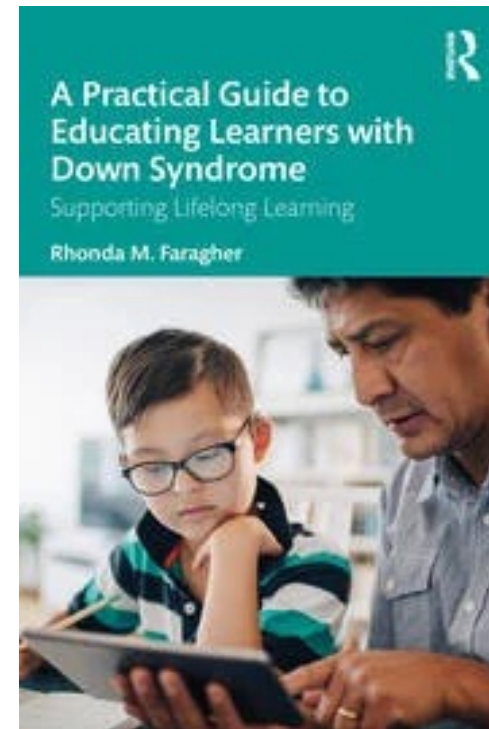
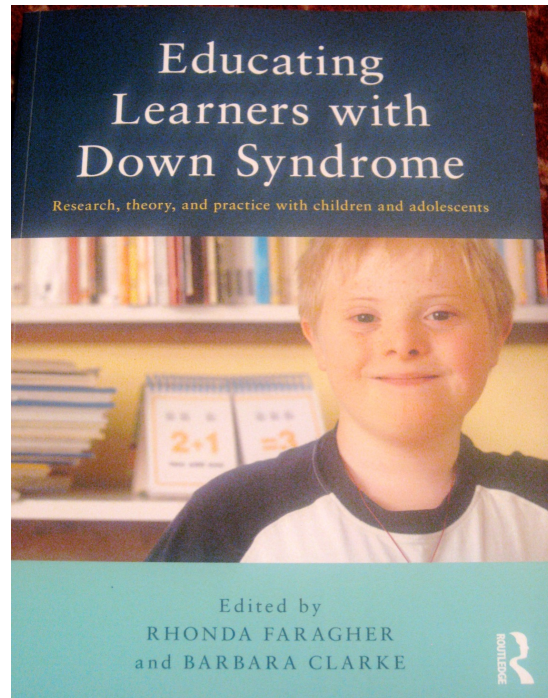
Entering numbers from a card

Age at inter view	6, 2	6, 4	6, 7	7, 0	7, 3	7, 9	8, 3	8, 8	9, 6	9, 11	10, 1	10, 1	10, 5	10, 6	10, 8	11, 1	11, 2	11, 2	11, 3	11, 5	11, 8	11, 9	12, 3
7																							
47																							
60																							
15																							
724																							
105																							
2469																							
6023																							

Educating Learners with Down Syndrome



- A research book
- A practical guide



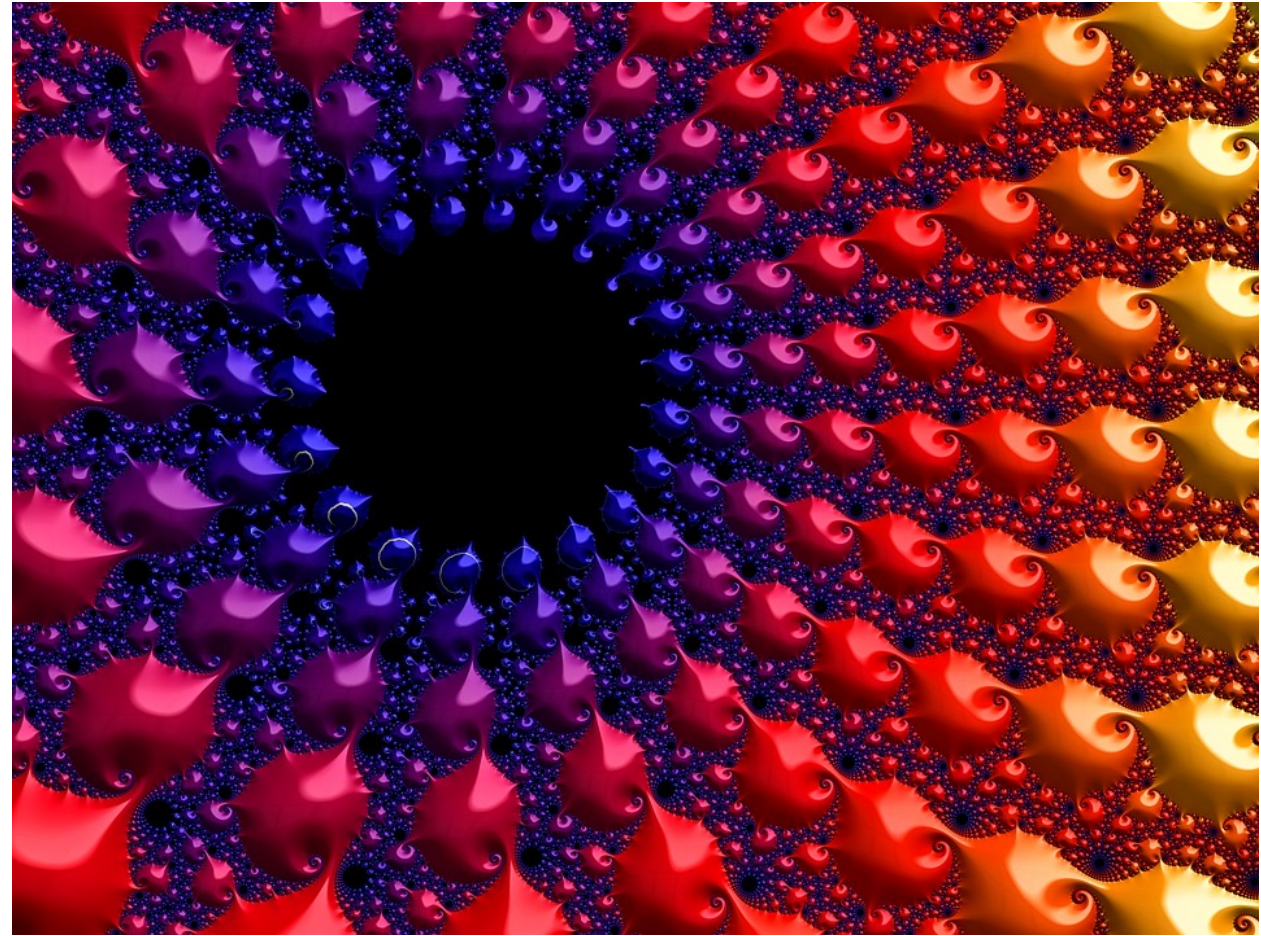
You're never too young for your first calculator...



... and you're never too old!

... all learners, all levels, at all times, for appropriate use.

Let's do some maths!



Use a calculator!

- Calculators promote learning

Try this...

Enter 34.5689

Now change the 6 to a 2.

How did you do it?

Are there other ways?

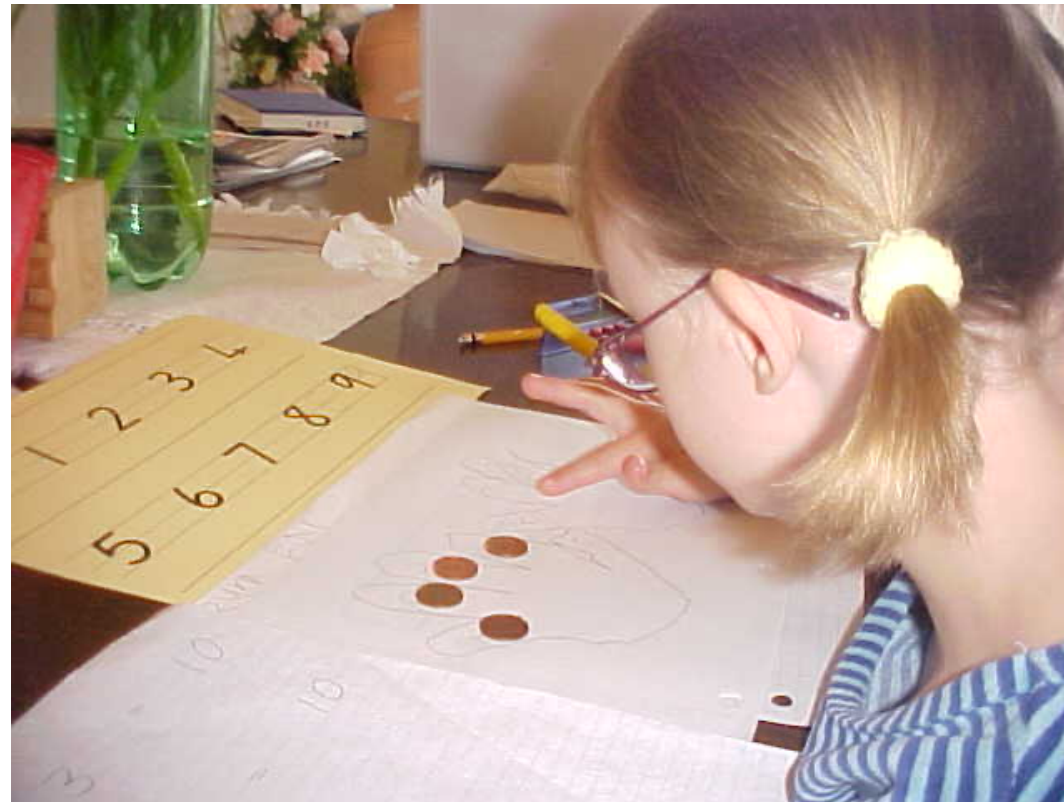


Today – where we are headed

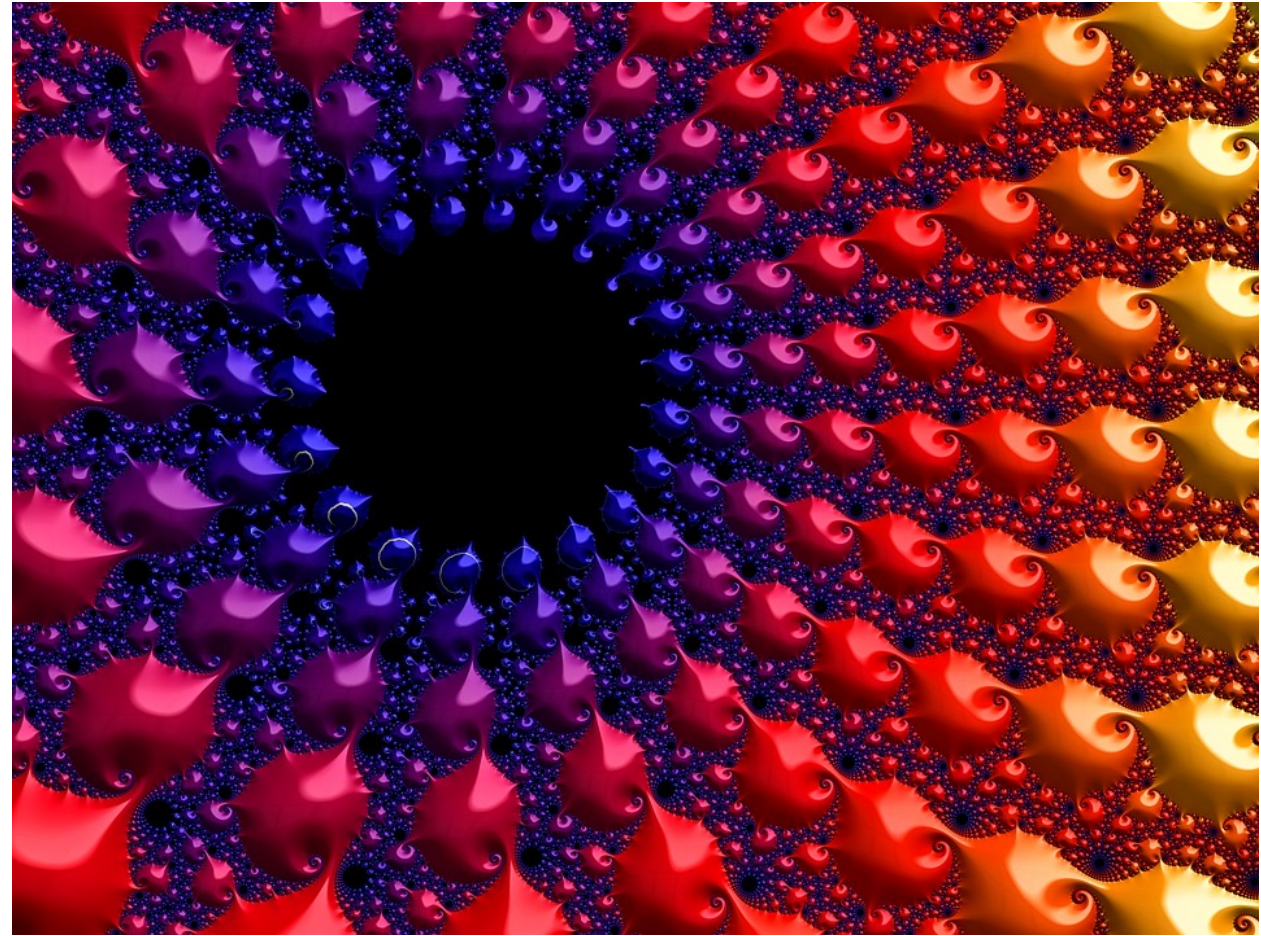
- Checking in, warming up
- Raising expectations
 - what might be possible?
 - should we?
- Big ideas of maths – number, geometry, time, money
- Keeping going – mathematical thinking



Count!



Let's do some maths!



Let's do some maths (Well sort of ☺)

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

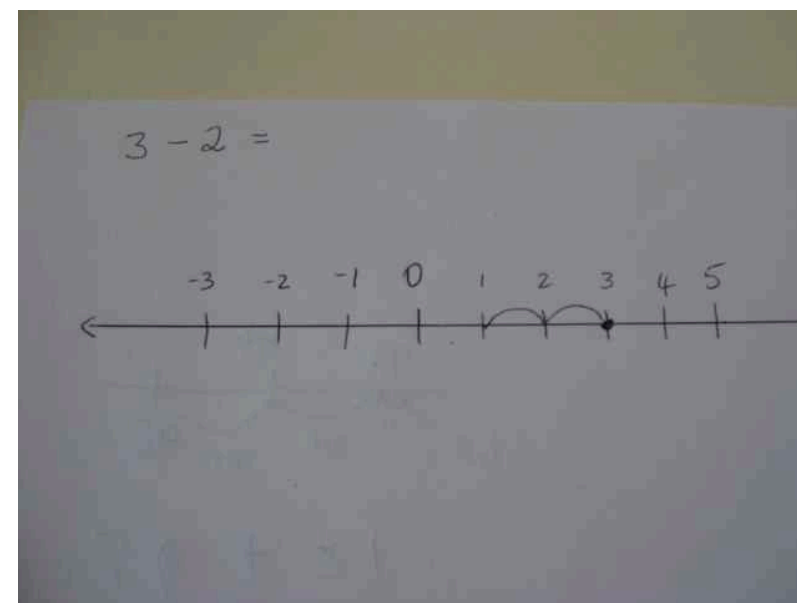
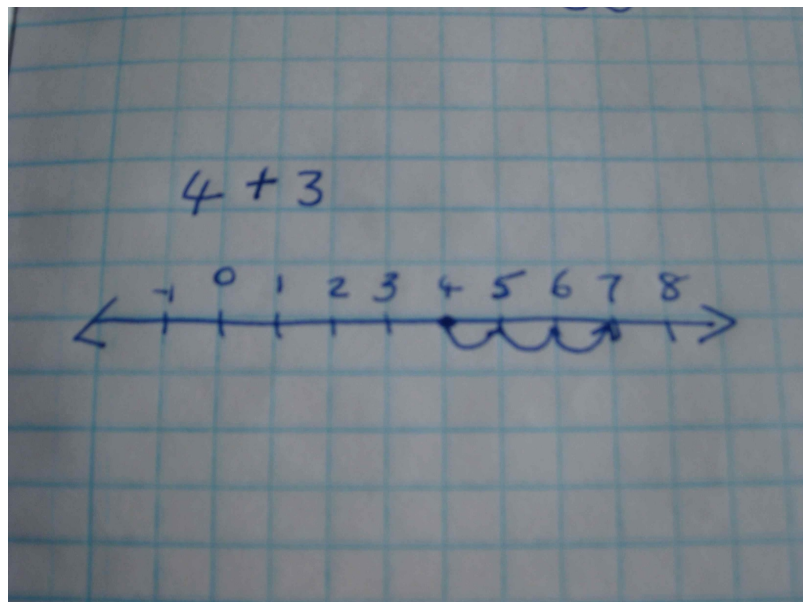
Let's do some maths (Well sort of ☺)

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
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30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

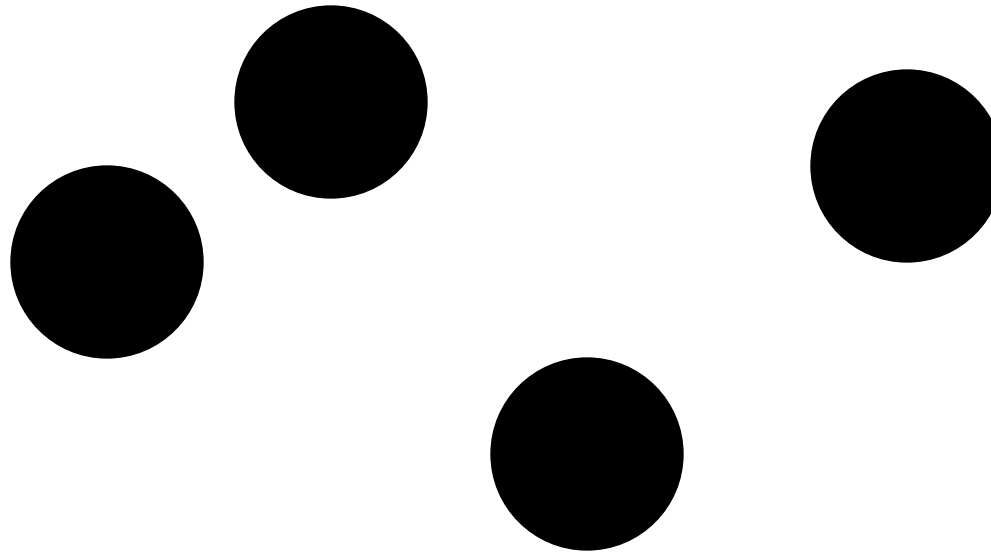
Count!

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34		36	37		39
40	41	42	43	44	45		47	48	
50	51	52	53			56	57	58	59
60	61		63	64	65		67	68	69

Count! – on a number line



Don't count!



Don't count!

- Subitising
 - being able to know how many there are WITHOUT counting!
 - from the Italian word, *subito*, meaning 'suddenly'!

Focus on the symbol

- Focus on visual
 - number lines,
 - 100 chart
 - feely digits



Use games

- Hot Dots
- Favourites e.g. cards, Monopoly
- Websites e.g. primarygames.com



Use games

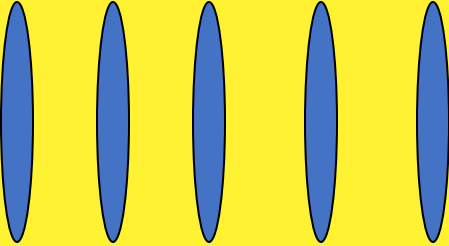
- kinaesthetic
- lots of repetition
- fun!
- teach, not test



Learning place value

- 23
is different to
32
- abacus
- number cards
- bundling



Hundreds	Tens	Units (or ones)
		

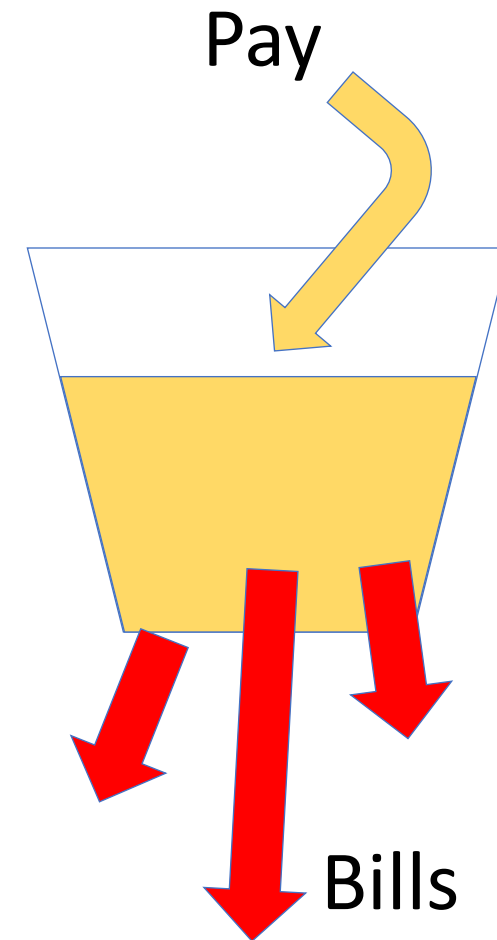
Money!

INNERSENSE Price List	
THREADING	\$15
Upper lips 挽上唇	\$28
Eyebrow 挽眉	\$58
Full Face (not include eyebrow) 挽脸 (不包括挽眉)	
TINTING	
Eyebrow (not include eyebrow shaping) 染眉毛 (不包括修眉)	\$48
Eyelash 染睫毛	\$38
All prices exclude GST	

EMBROIDERY 纹绣服务	
Eyebrow Embroidery 眉毛纹绣	
• Classic Embroidery 经典绣眉	\$398
• Classic 3D Eyebrow 经典3D眉	\$698
• Classic Fluffy Eyebrow 经典沙雾眉	\$1288
• Korea Microblading Eyebrow 韩式雕眉	\$1980
• Korea Ombre Misty Eyebrow 韩式粉雾眉	\$3980
• Lucky Eyebrow 开运眉	\$6888
Eyeliner Embroidery 眼线纹绣	
• Eyelash Enhancement Liner 美童线	\$1288
• Eyeliner Enhancement Liner 美睫线	\$1688+
• Eye Carving Liner 四维眼雕线	\$2688
• Misty Lower Liner 韩式点状式下眼线	\$588
Lip Embroidery 嘴唇纹绣	
• Glaze Lip Embroidery 琉璃唇	\$1888
• Korean Misty Lips Embroidery 韩式粉黛唇	\$3980

Big ideas of money

- budget
Slogan:
‘Your money is like a bucket!’
- will I get change?
- order of magnitude
- using EFTPOS
 - day to day account
 - separate linked account
 - maximum daily withdrawal limits



Tools of maths

- Necessary part of being numerate
- Tools – some no longer
 - Log tables
 - Slide rule
- Tools – some for now
 - Abacus
 - Spreadsheets
 - Graphing software
 - Statistics tools
 - Bank apps and tools
 - Calculator



Maths is more than number!

- geometry



Measuring & Space

- Jigsaws
- Water play
- Patterns



Measurement is practical



Cooking

- Cooking by itself does not teach mathematics!
- Focus on measurement
- Only use a whole cup - estimate fractional amounts.



Time

You need to understand:

- the concept of time duration
- the passing and sequencing of time
- determining a given point in time (reading a clock)
 - understand clocks are measuring time (noon is when the sun is the highest)



Time

- Start with identifying the hour hand
- Use the hour hand alone
- Move to minute hand

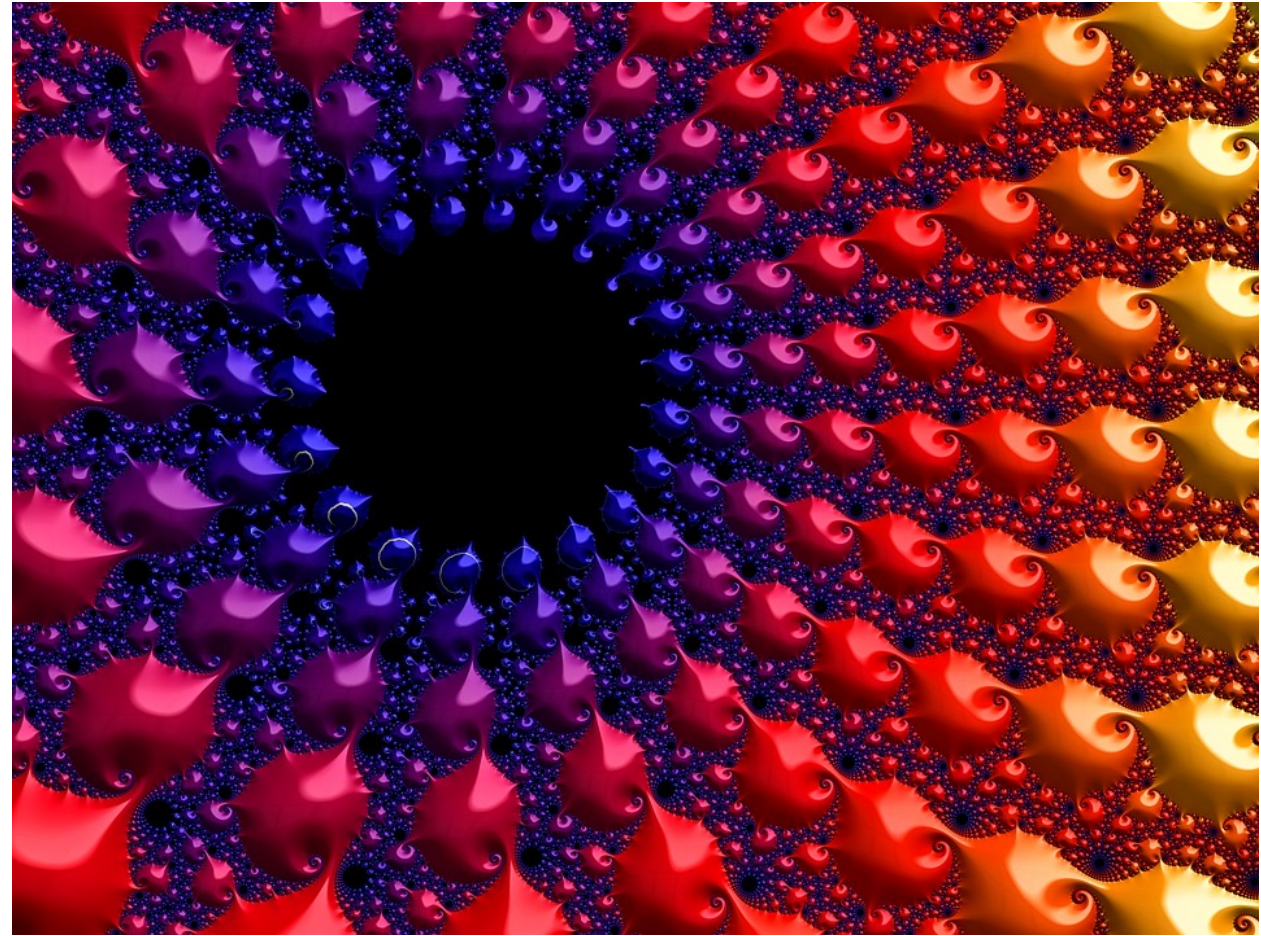


Today – where we are headed

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Let's do some maths!



Let's do some maths!

Which numbers have
an odd number of
factors?

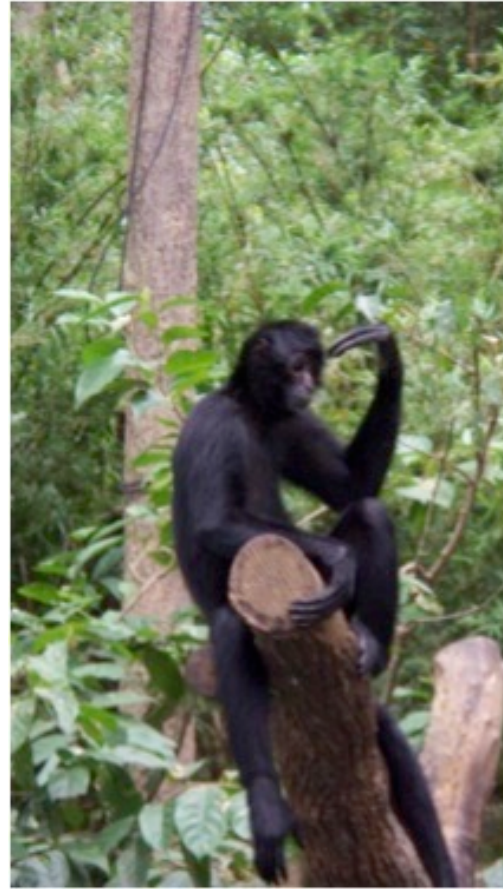


A visual representation of the factors of 12



$\{1, 2, 3, 4, 6, 12\} = 6$ factors

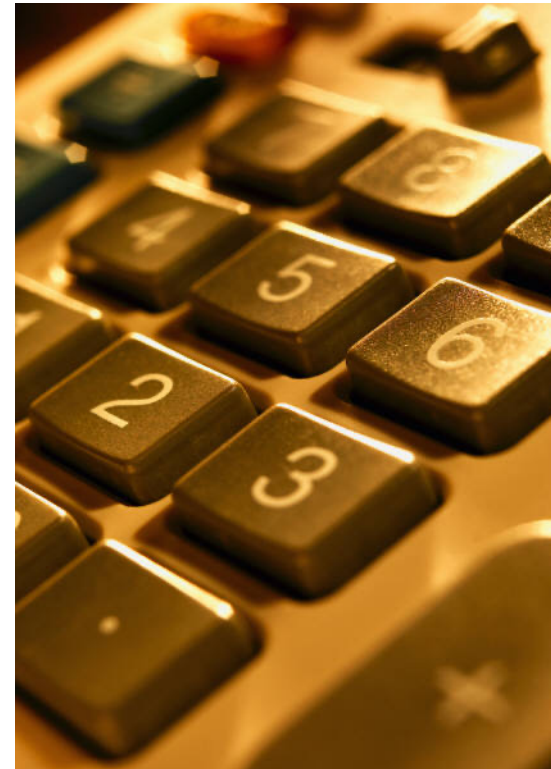
Time to think





Making a start

- What do you need to know or be able to do to make a start?



How far can you go?



Rich tasks in mathematics!

- allow all students to make a start
- many possible methods or approaches
- provide a measure of openness
- are themselves worthwhile activities for student learning
- provide challenge at a range of levels
- address a range of outcomes in the one task
- ...



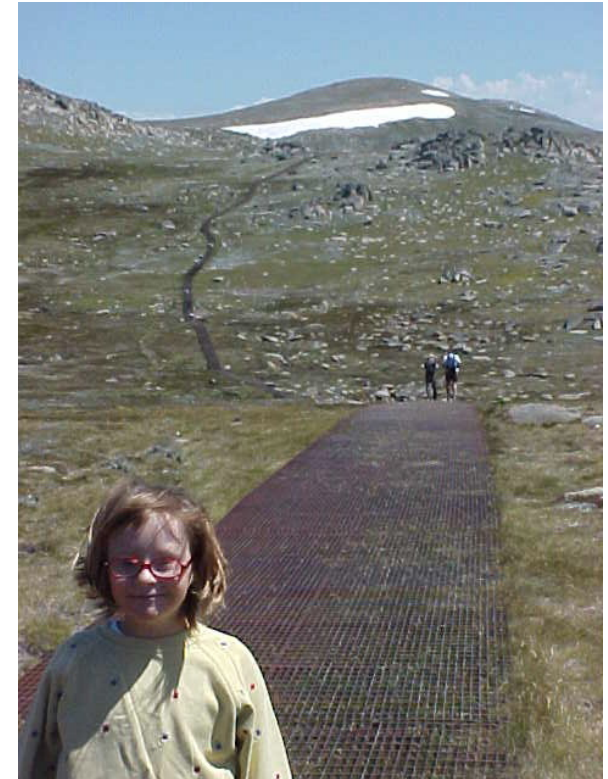
Today – where we've been

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Conclusion...

- It's a journey
- low expectations have held learners back
- calculation is a challenge for students with Down syndrome BUT maths is *more than* calculation!
- Embrace success and enjoy learning maths together!



Questions, comment, ideas...



Thank you

- to the people with disabilities who have contributed to my learning
- parents who've shared the journey





Stay in touch!

R.Faragher@uq.edu.au