Math 305

Advanced Algebra and Trigonometry!

Hitting the Wall...

...time to get complex!

Eighth Class – Tuesday, July 8th

- POTD – yikes!
  - *it's just a bit twisted!*
- and then finally…!
  - *introduction to Singapore Math!*
- A history tour – the quadratic formula
  - *why "quadratic"?*
  - *it's almost fun to do!*
- And now… the cubic formula!
  - *leading to a whole new world of numbers!*

POTD – good luck!

Here's a "simple" problem… what is the value of

$$\sqrt{\sqrt{8-2\sqrt{7}}-\sqrt{7}}$$

*** or should I say "complex"?!**

Now it's time for a (new?) perspective!

Apart from exploring the mathematics of higher algebra, we will use a variety of approaches to explore algebraic concepts together…

Singapore Math!

Teaching and Learning… differently!

Singapore consistently demonstrates high performance on international math tests

In 1975 the Singapore Ministry of Education (MOE) conducted a survey to investigate the mathematical attainment of its primary students…

They found that at least 25% of sixth grade students didn't meet the minimum numeracy level.

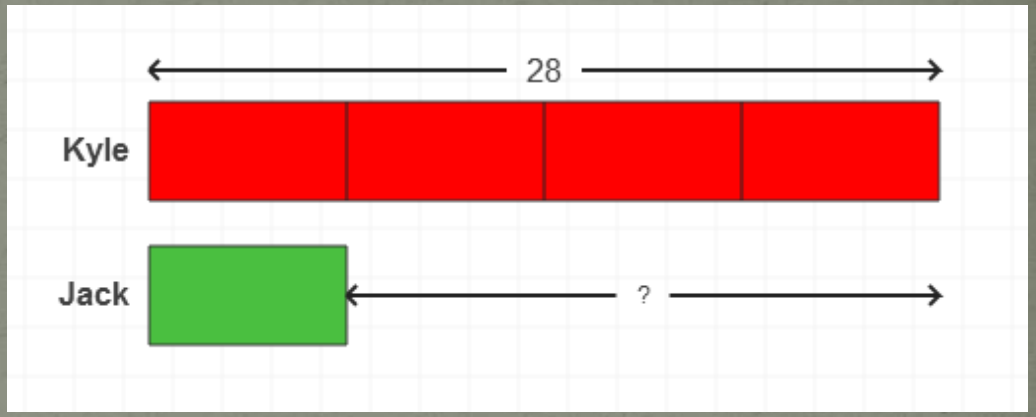
87% of fourth grade students could solve problems when key words like "altogether" or "left" were given, but only 46% could solve them without the key words.

The MOE called for a major curriculum review and overhaul

Based on the latest educational research, they designed an approach based on CPA

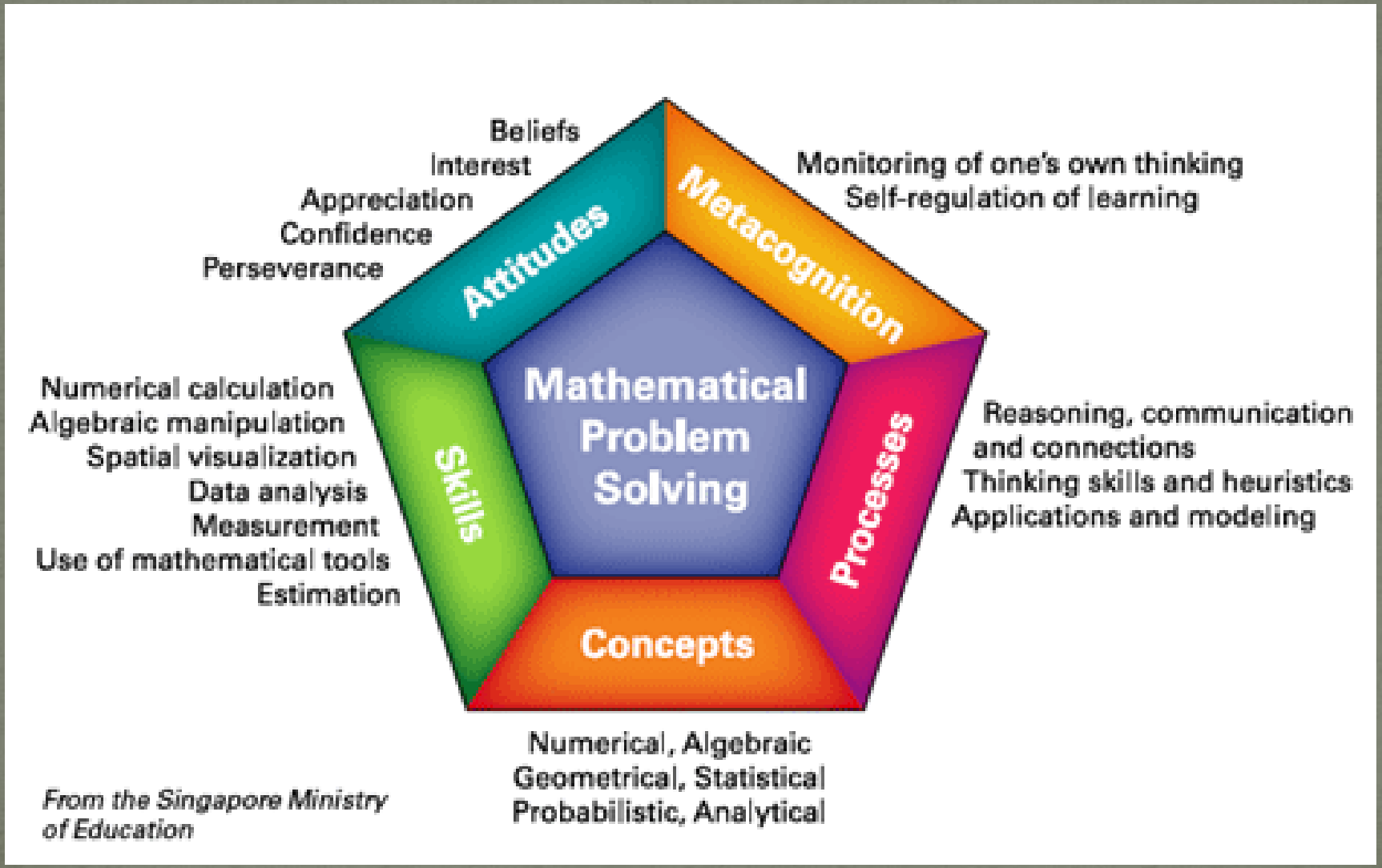
= ***Concrete-Pictorial-Abstract***

In the 1980s they added the Model Method or "Bar Method" for problem solving…



The main aspects of the Singapore approach are known collectively as "Singapore Math"

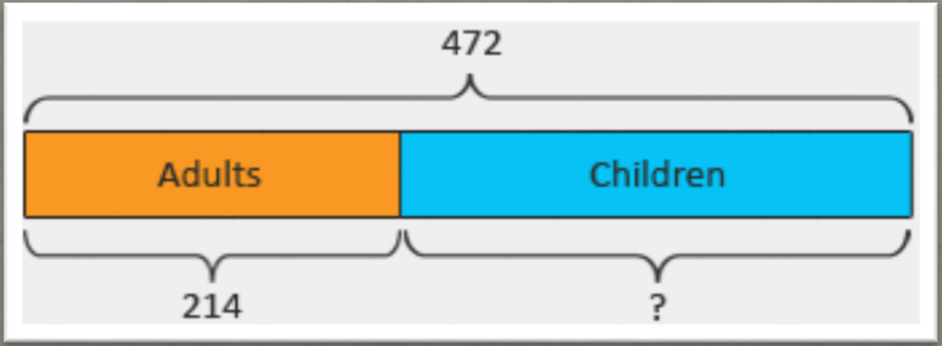
Singapore's approach to problem solving



Time to explore the Model Method!

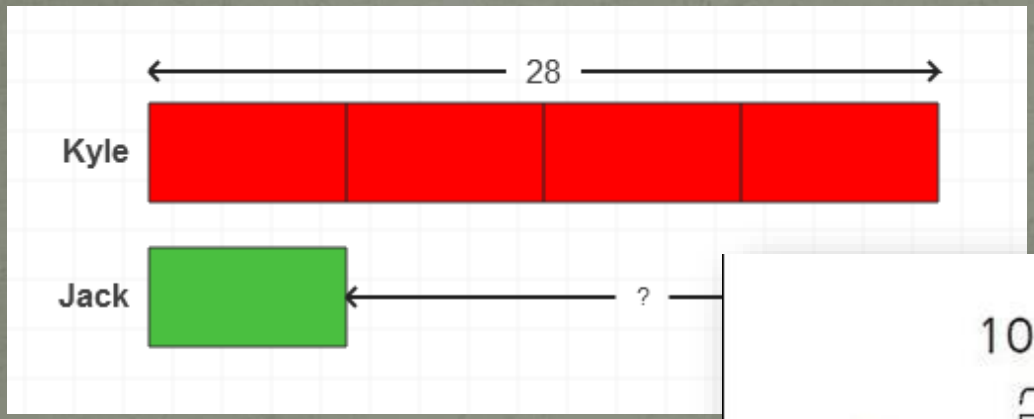
There are several different aspects to it…

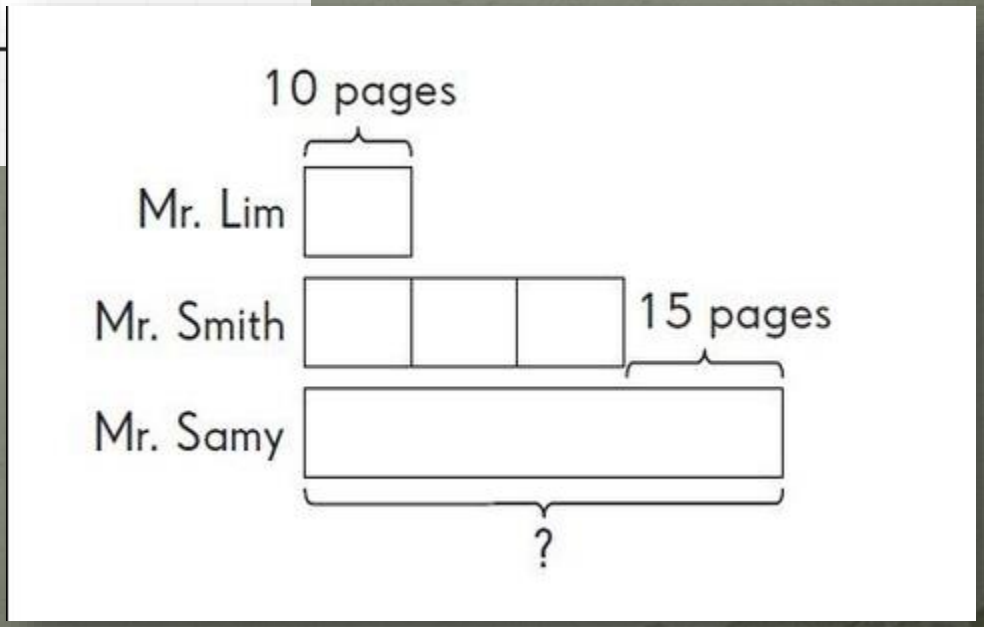
First the Part-Whole Model:



Then the Comparison Model:

The Comparison Model can also be used for multiplicative relationships, as well as even more complicated situations involving ratios and fractions





Hmm… what possible problem might be represented here?

The point is that this approach allows students to visualize unknowns, and see relationships – important starting points for problem solving

Try this –

The ratio of Peter's money to John's money was 3 to 5 at first. Peter earned $250 and John spent $350 on a motorscooter. At this point they had the same amount of money.

How much money did Peter have to start with?

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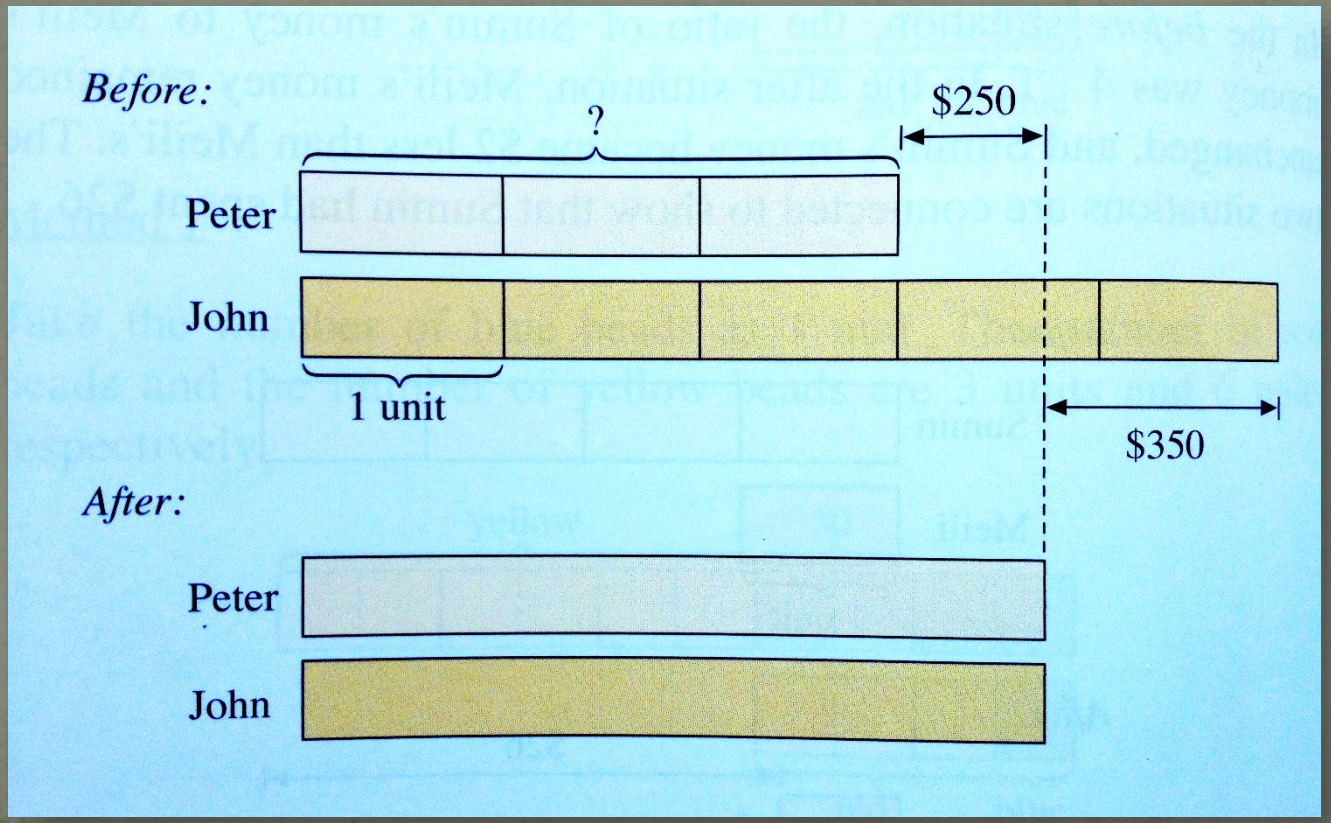

The Model Method lends itself easily as a stepping stone towards the use of algebraic variables, and for writing algebraic expressions, and solving equations

Try this –
Armando has 3 times as much money as Barbara.
Barbara has $200 less than Carlos.
Carlos has $50 more than Armando.
Find the total amount of money the three have.

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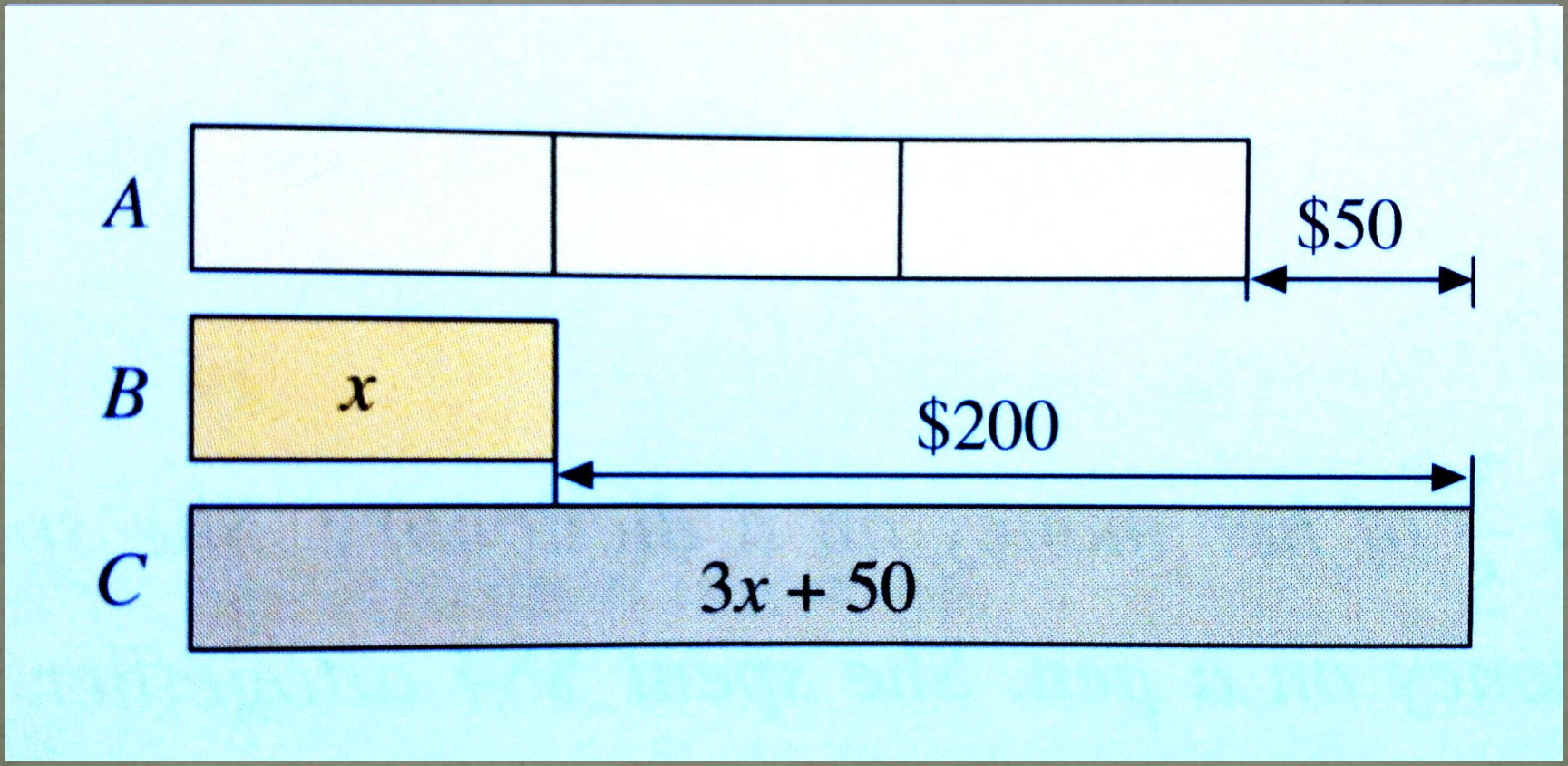
Find the total amount of money that the three have.



and now time for a little tour!

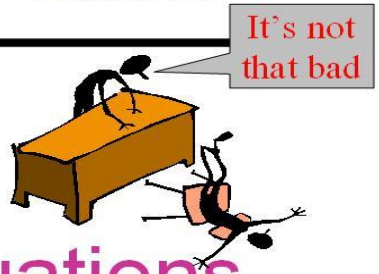
The Quadratic Formula…

why "quadratic"?

doesn't that mean "four"?

The Quadratic Formula …

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



For Quadratic Equations

$ax^2 + bx + c = 0$

two

. .

Time for a few questions!

Solve $x^2 = 64$…

Solve $(w - 3)^2 = 64$

Solve $4(m + 3)^2 - 64 = 0$

Solve $16(z + 2)^2 + 64 = 0$