re(Solve)

MATHS BY INQUIRY

Australian Academy of Science

aamt

Purposeful goals, challenging tasks, knowledge-building activities: Mathematics by Inquiry

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Turning the tables on multiplication

The philosophy of arithmetic, exhibiting a progressive view of the theory and practice of calculation, with tables for the multiplication of numbers as far as one thousand.

John Leslie, 1820

63 x 11

52	676
53	702
54	729
.	.
.	.
.	.
73	1332
74	1369

A set of tasks to promote
Algebra as Generalised Arithmetic

1. Tens and units

2. Visual algebra

3. Curious calculations

Tens and units

1. Choose three distinct digits.

   Make all the 2-digit numbers you can from these digits.

   Find the sum of these numbers.

   What do you notice? Why does this work?

2. Show that the number $100a + 10b + c$ is divisible by 3 if and only if $a + b + c$ is divisible by 3.
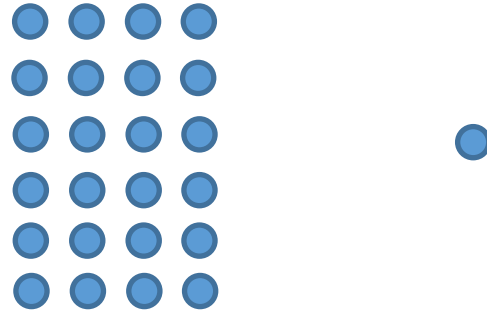
   https://www.mathlearningcenter.org/web-apps/number-pieces/

Visual algebra

$1 \times 3 + 1 = 4$

$2 \times 4 + 1 = 9$

$3 \times 5 + 1 = 16$

...

Can you generalise and visualise…

$1 + 3 = 4$
$1 + 3 + 5 = 9$
$1 + 3 + 5 + 7 = 16$
...

$2(1^2 + 2^2) = 1^2 + 3^2$
$2(2^2 + 5^2) = 7^2 + 3^2$
$2(3^2 + 5^2) = 8^2 + 2$
...

$1 + 1 \times 4 + 4 = 9$
$4 + 4 \times 9 + 9 = 49$
$9 + 9 \times 16 + 16 = 169$
...

$1 + 2 = 3$
$4 + 5 + 6 = 7 + 8$
$9 + 10 + 11 + 12 = 13 + 14 + 15$
...

Curious calculations

Test for primeness		$n=$	377
Add a square	**Sum**		**Square root**
1	378		19.4422221
4	381		19.5192213
9	386		19.6468827
16	393		19.8242276
25	402		20.04993766
36	413		20.32240143
49	426		20.63976744
64	441		21
81	458		21.40093456
100	477		21.84032967

Is 377 prime or composite?

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http://resolve.edu.au

The reSolve: Maths by Inquiry Protocol

reSolve mathematics is purposeful.

reSolve tasks are challenging yet accessible.

reSolve classrooms have a knowledge-building culture.

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