Picture Puzzles

SQUARE NUMBERS

Picture Puzzles

Picture Puzzles

Creator ... Doug. Williams
Publisher ... Mathematics Centre

This Picture Puzzle is based on
... Task 111, *Square Numbers*
Teaching Notes
... mathematicscentre.com/picturepuzzles/teachingnotes

Picture Puzzles

Picture Puzzles

To Do

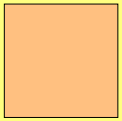
1. Look at visual patterns to find numbers.
2. Check your answers by calculating in two ways.
3. Learn more about Square Numbers.

You Need

- Square tiles or cube blocks
- Square graph paper

Picture Puzzles

Picture Puzzles

Make this... 

$S_1 = 1$

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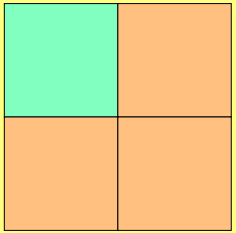
Now this...



$S_1 = 1$

$S_2 = 4$

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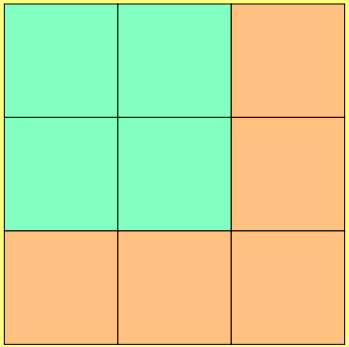
Now this...



$S_1 = 1$

$S_2 = 4$

$S_3 = 9$

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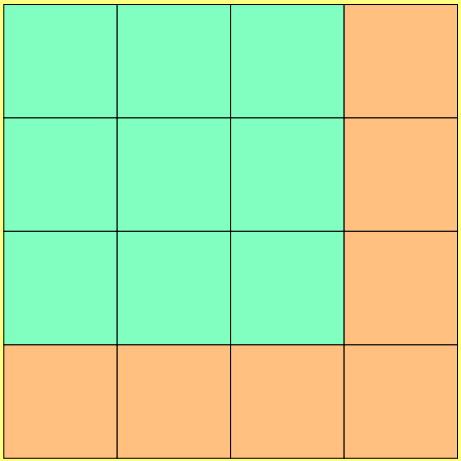
Now this...



$S_1 = 1$

$S_2 = 4$

$S_3 = 9$

$S_4 = 16$

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Predict S_5

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Predict S_5 another way.

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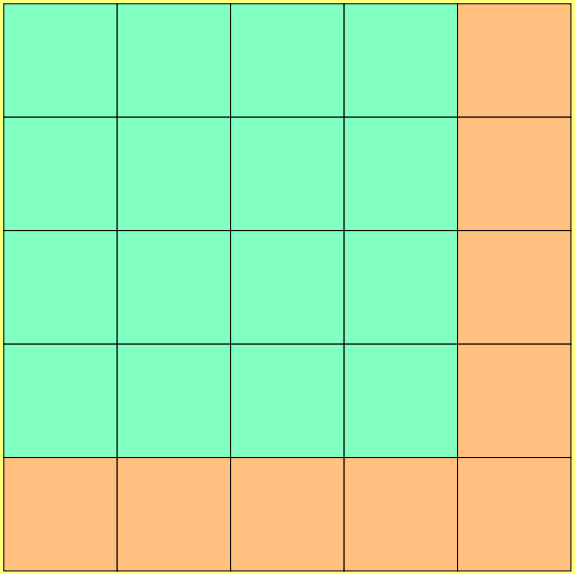

$S_1 = 1$

$S_2 = 4$

$S_3 = 9$

$S_4 = 16$

$S_5 = 25$

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Predict S_6 in two different ways.

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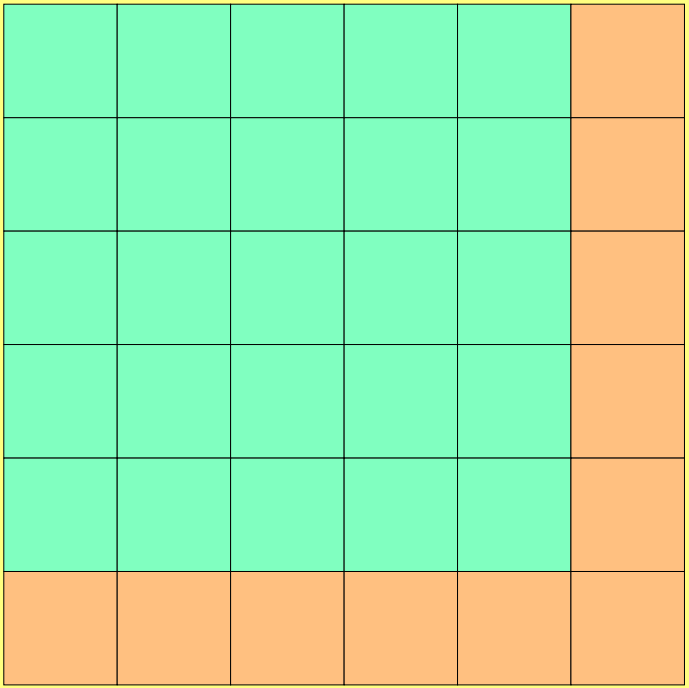

$S_1 = 1$

$S_2 = 4$

$S_3 = 9$

$S_4 = 16$

$S_5 = 25$

$S_6 = 36$

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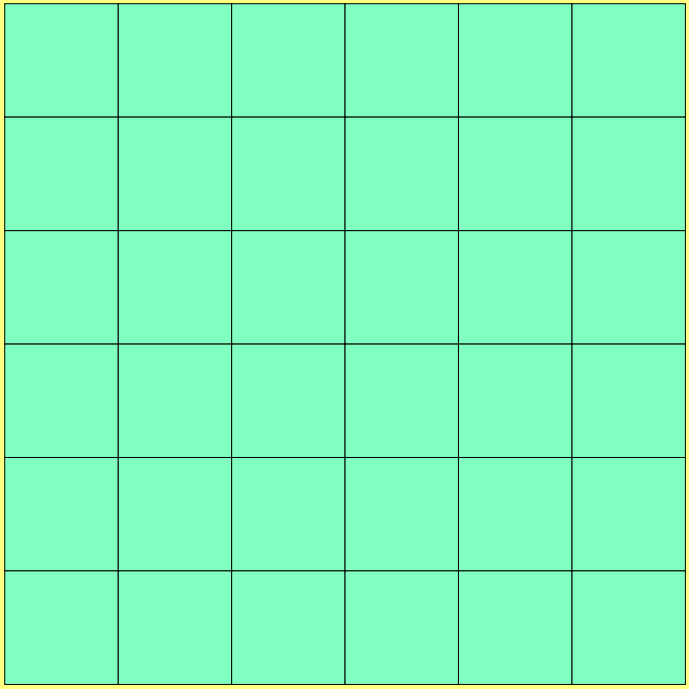

$S_1 = 1$

$S_2 = 4$

$S_3 = 9$

$S_4 = 16$

$S_5 = 25$

$S_6 = 36$

...

$S_{20} = ??$

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You might be correct for S_{20}

Can you check it another way?

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Choose any size square.
Calculate the number of small squares in two different ways.

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Write and draw about
Square Numbers
in your journal.

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Can you explain why the L-shape must be an odd number?

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Picture
Puzzles

more

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To Do

1. Place one square on top of another square.
2. Calculate the uncovered area - difference between the two squares.
3. Check your answer by calculating in two ways.

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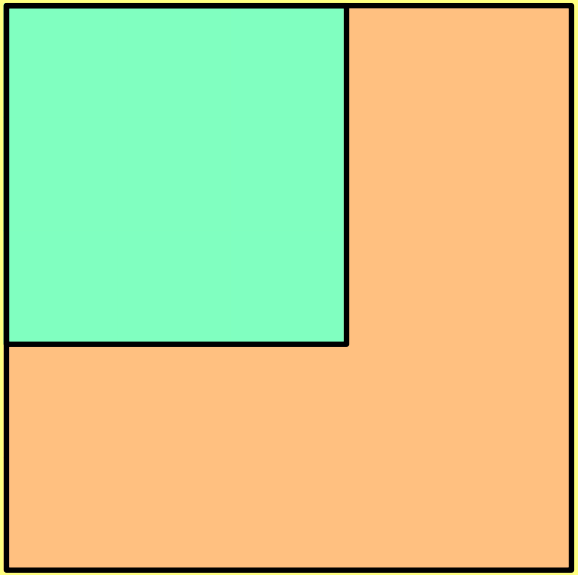

S_3 on top

S_5 below

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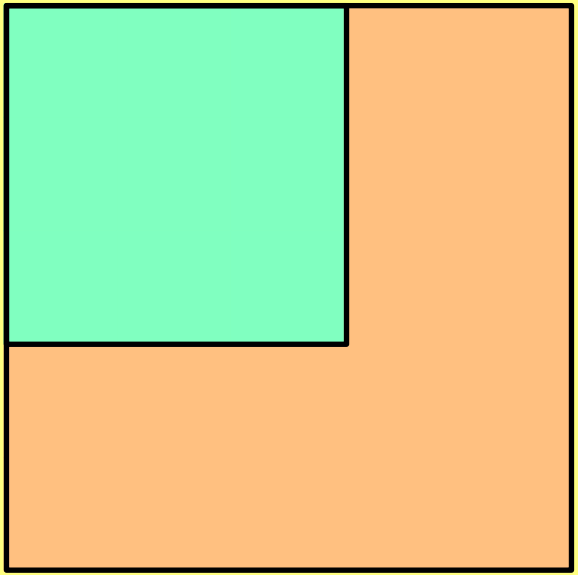

S_3 on top

S_5 below

$S_5 - S_3$

=

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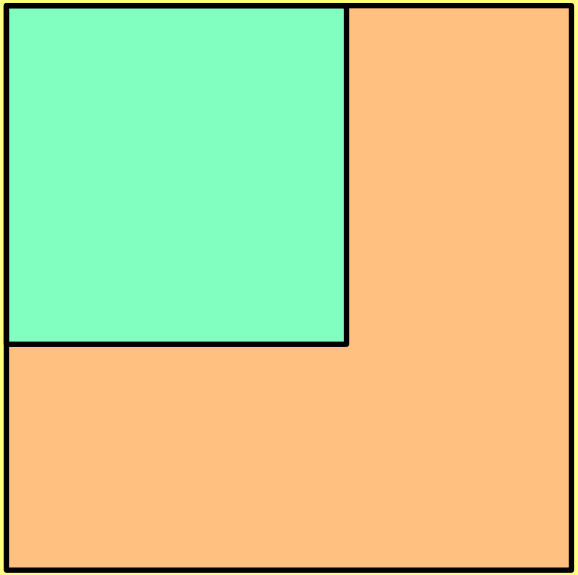

S_3 on top

S_5 below

$S_5 - S_3$
$= 25 - 9$
$=$

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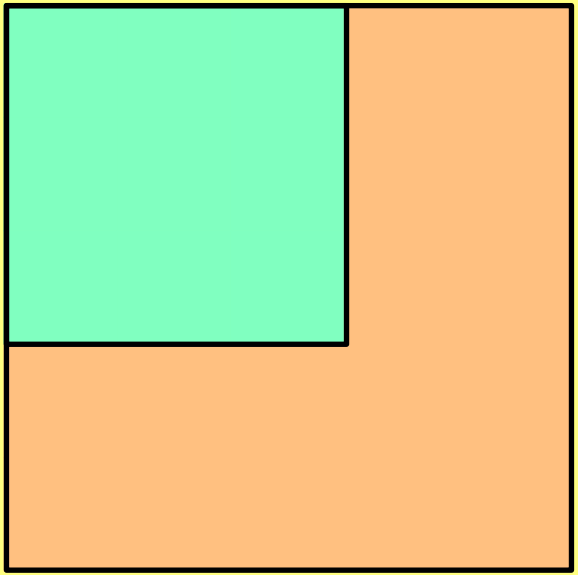

S_3 on top

S_5 below

$S_5 - S_3$
$= 25 - 9$
$= 16$

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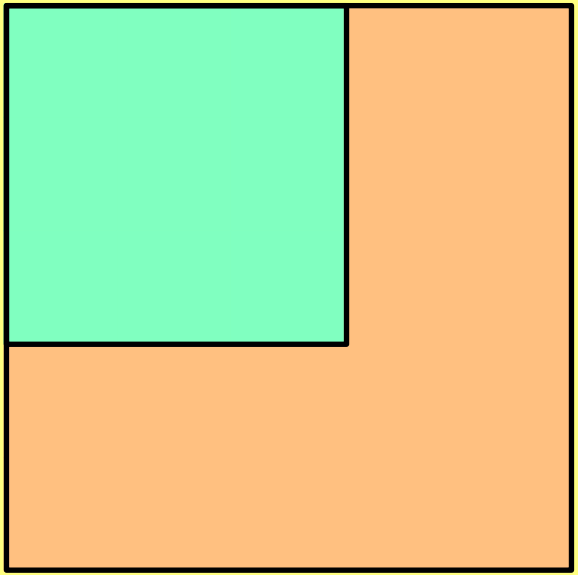

S_3 on top

S_5 below

$S_5 - S_3$
$= 25 - 9$
$= 16$

Difference between two squares

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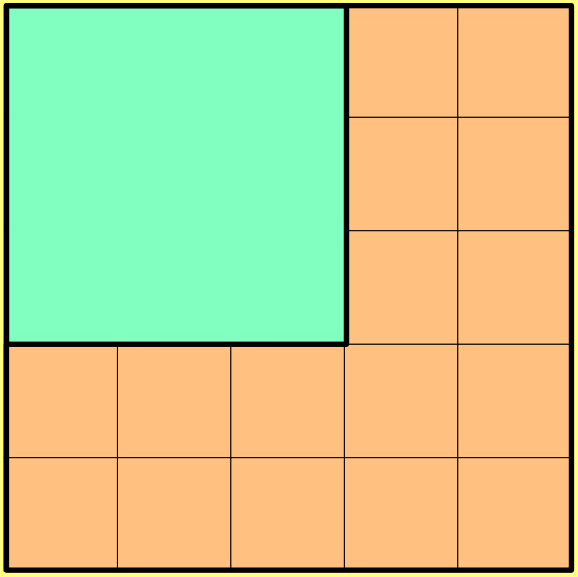
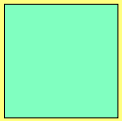
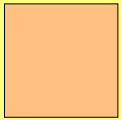




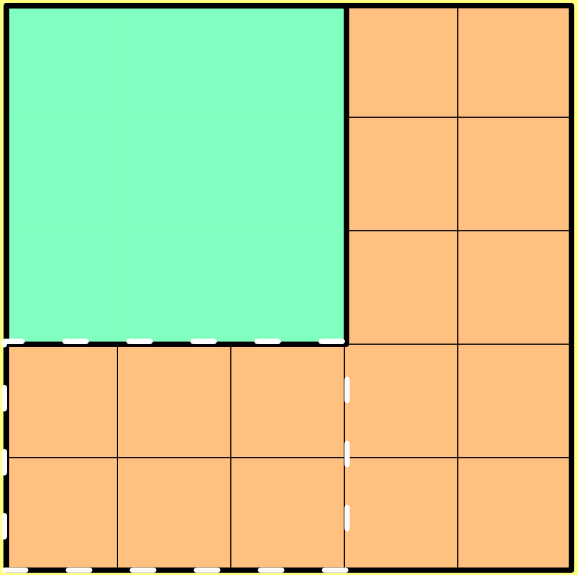
S_3 on top



S_5 below

Picture Puzzles

Picture Puzzles

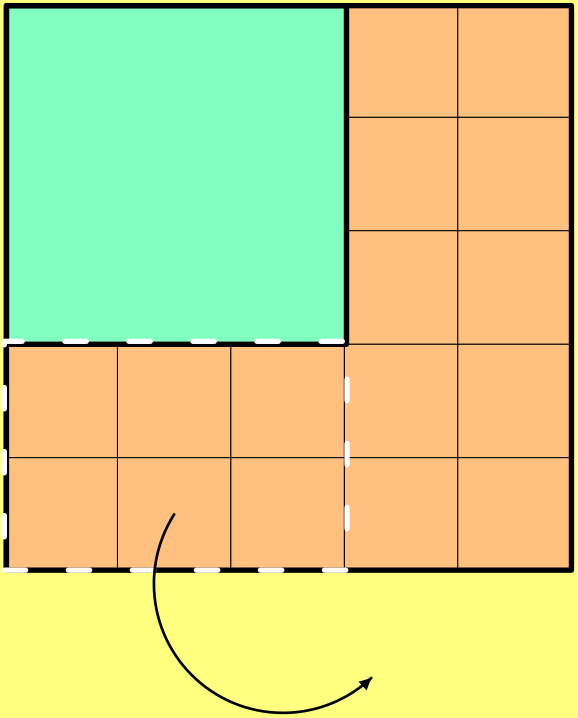


S_3 on top

S_5 below

Picture Puzzles

Picture Puzzles

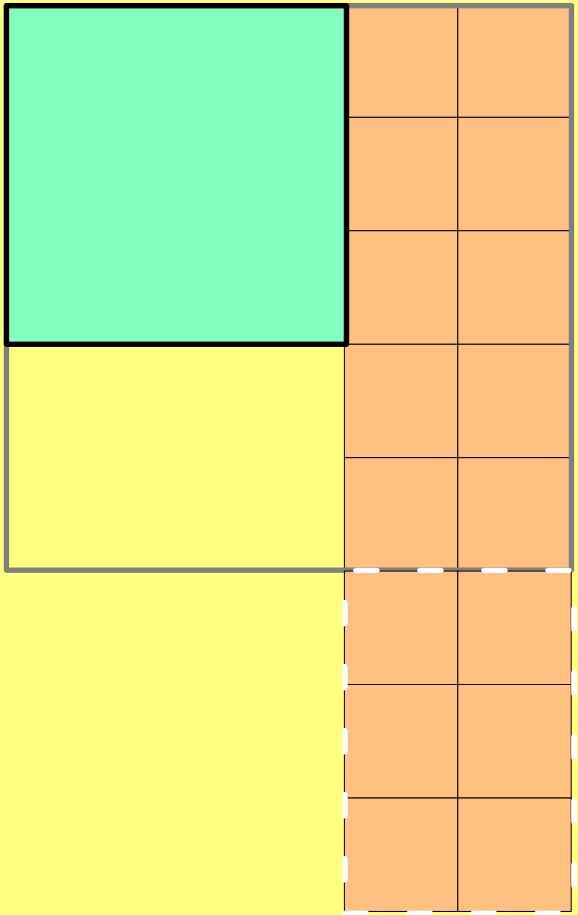


S_3 on top

S_5 below

Picture Puzzles

Picture Puzzles

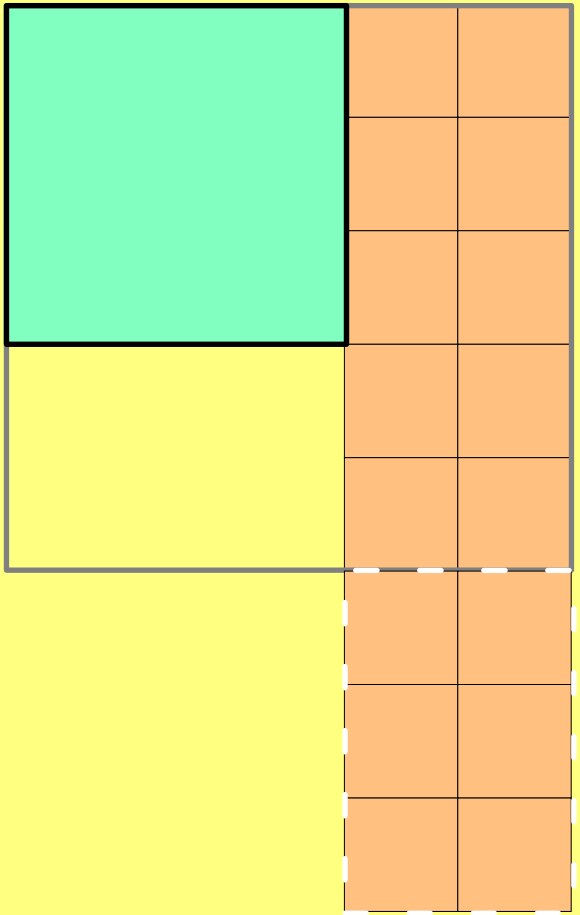


S_3 on top

S_5 below

Picture Puzzles

Picture Puzzles



S_3 on top

S_5 below

$S_5 - S_3$

=

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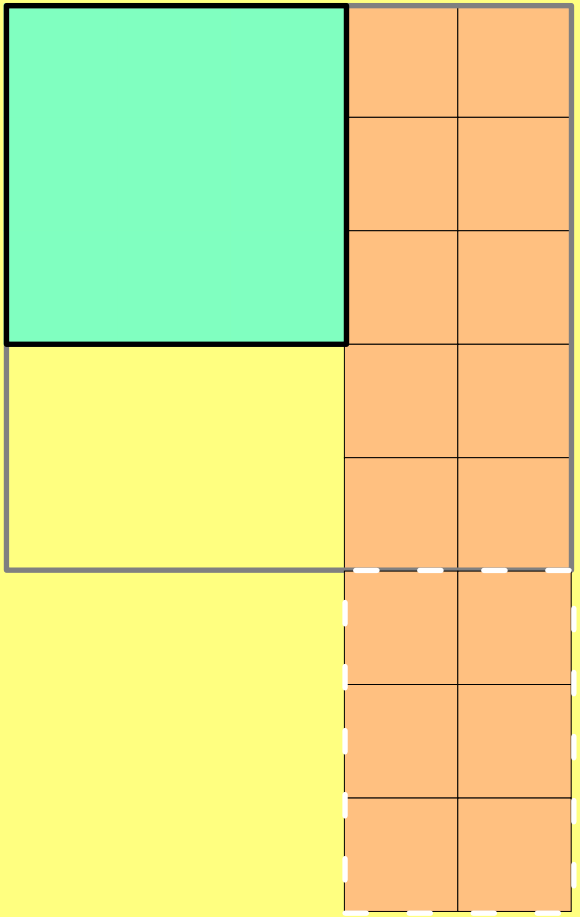

S_3 on top

S_5 below

$S_5 - S_3$
$= (5 + 3)(5 - 3)$

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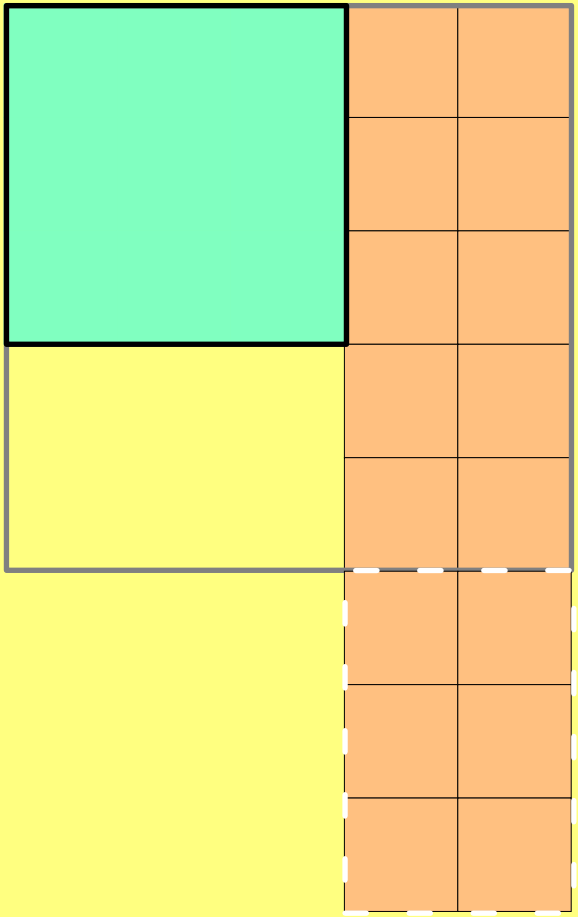

S_3 on top

S_5 below

$S_5 - S_3$
$= (5 + 3)(5 - 3)$
Where do these two factors come from?

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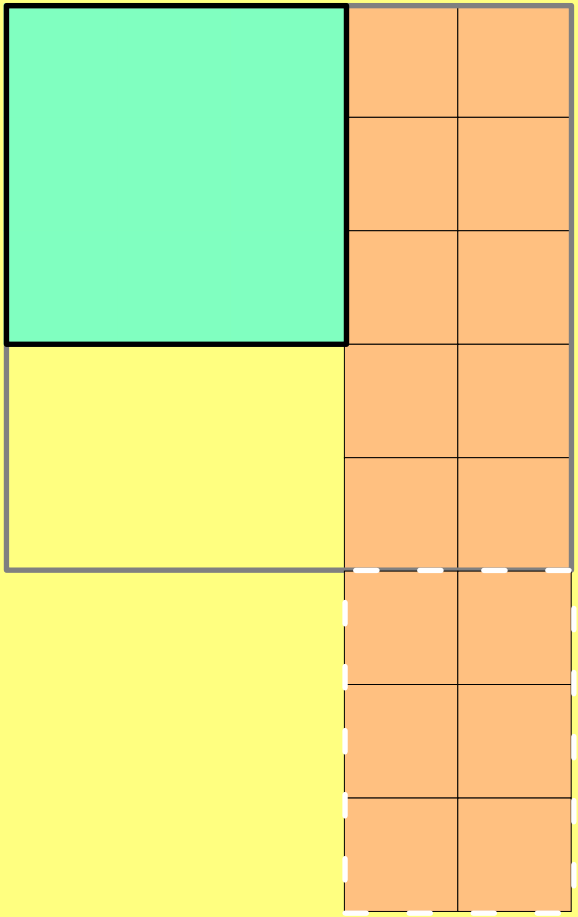

S_3 on top

S_5 below

$S_5 - S_3$
$= (5 + 3)(5 - 3)$
$= 8 \times 2$
$= 16$

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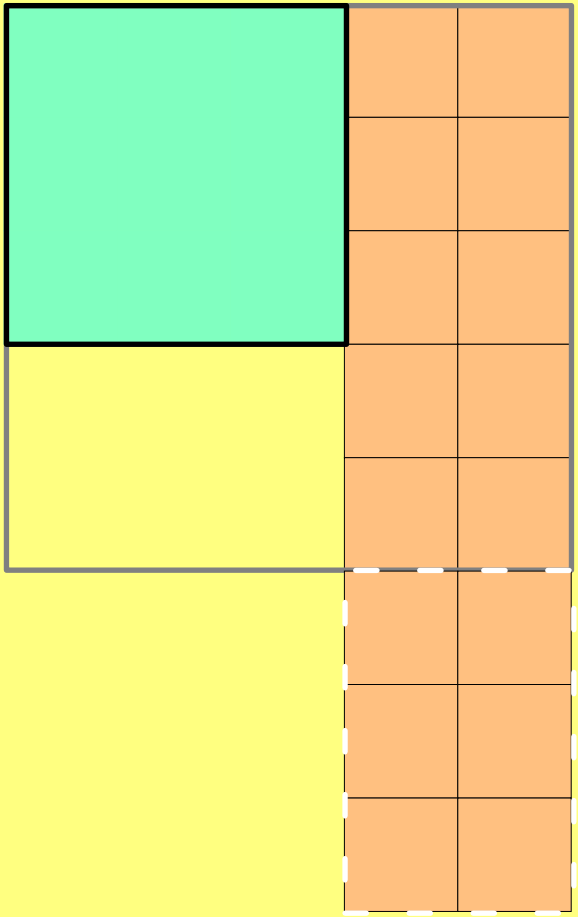

S_3 on top

S_5 below

$S_5 - S_3$
$= (5 + 3)(5 - 3)$
$= 8 \times 2$
$= 16$

Difference between two squares

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Choose two other squares.

Find their difference in two ways.

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If I tell you the size of any two squares,

Can you tell me their difference in two ways?

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Puzzles

THE END...

...OR IS IT?

Picture
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