

SQUARE NUMBERS

Picture Puzzles

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This Picture Puzzle is based on

... Task 111, *Square Numbers*

Teaching Notes

... mathematicscentre.com/picturepuzzles/teachingnotes

Picture Puzzles

To Do

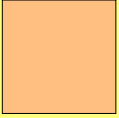
1. Look at visual patterns to find numbers.
2. Check your answers by calculating in two ways.
3. Learn more about Square Numbers.

You Need

- Square tiles or cube blocks
- Square graph paper

Picture Puzzles

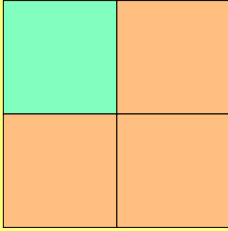
Make this...



$$S_1 = 1$$

Picture Puzzles

Now this...

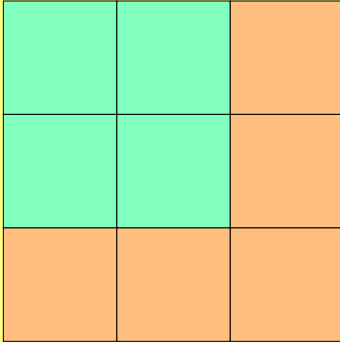


$$S_1 = 1$$

$$S_2 = 4$$

Picture Puzzles

Now this...



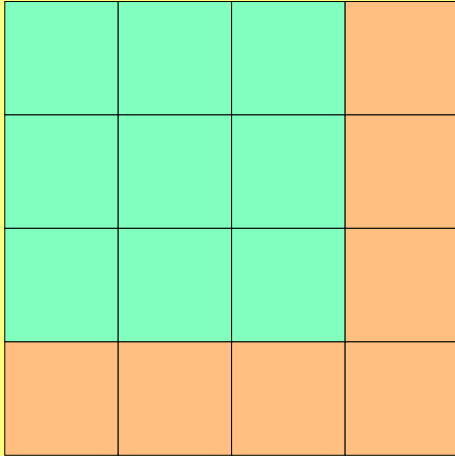
$$S_1 = 1$$

$$S_2 = 4$$

$$S_3 = 9$$

Picture Puzzles

Now this...



$$S_1 = 1$$

$$S_2 = 4$$

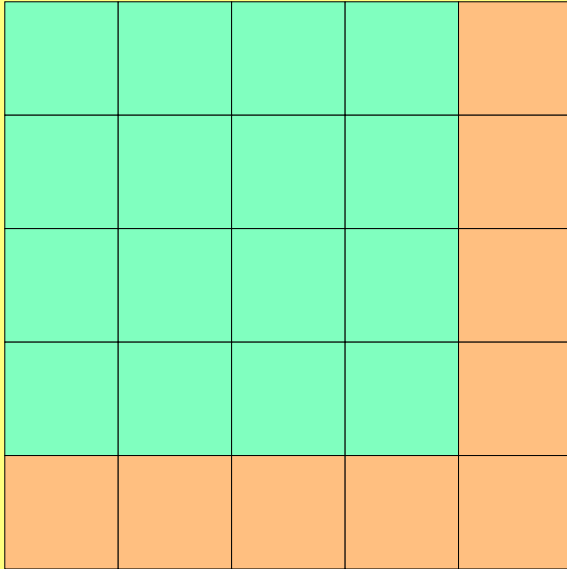
$$S_3 = 9$$

$$S_4 = 16$$

Predict S_5

Predict S_5 another way.

Picture Puzzles



$$S_1 = 1$$

$$S_2 = 4$$

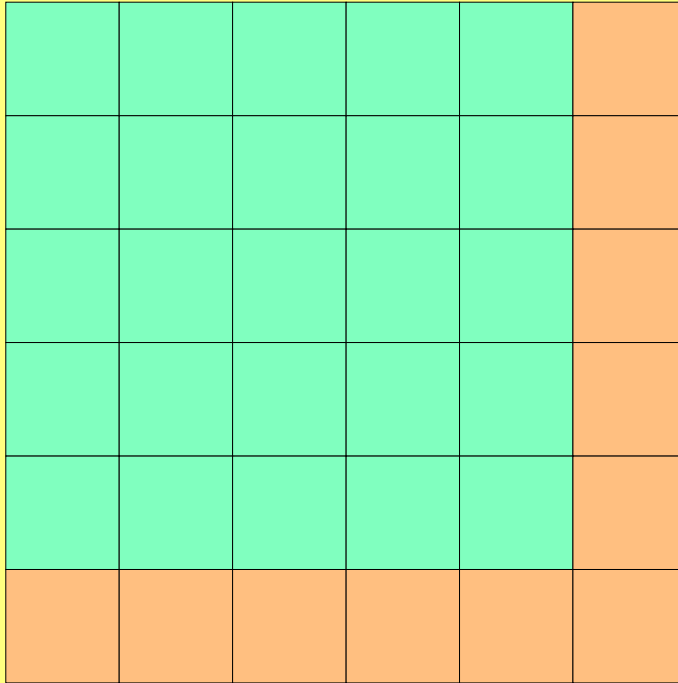
$$S_3 = 9$$

$$S_4 = 16$$

$$S_5 = 25$$

Predict S_6 in two different ways.

Picture Puzzles



$$S_1 = 1$$

$$S_2 = 4$$

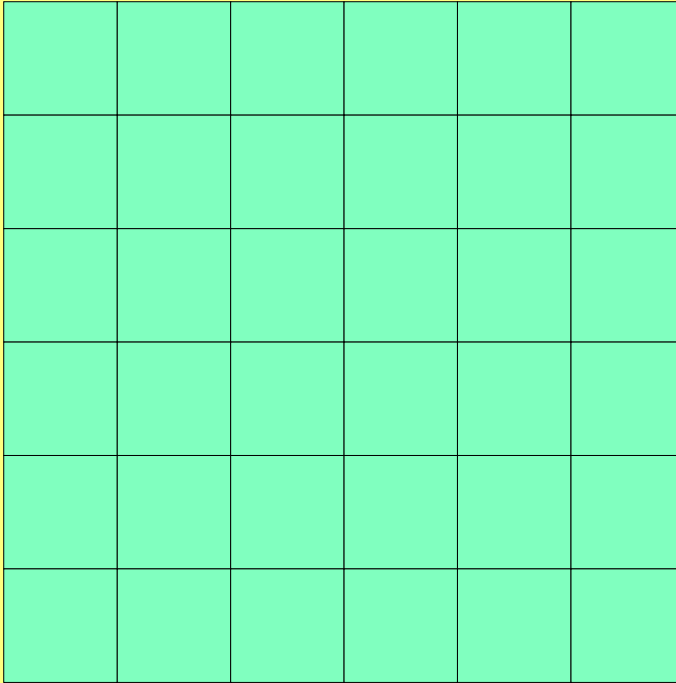
$$S_3 = 9$$

$$S_4 = 16$$

$$S_5 = 25$$

$$S_6 = 36$$

Picture Puzzles



$$S_1 = 1$$

$$S_2 = 4$$

$$S_3 = 9$$

$$S_4 = 16$$

$$S_5 = 25$$

$$S_6 = 36$$

...

$$S_{20} = ??$$

You might be correct for S_{20}

Can you check it another way?

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

**Write and draw about
Square Numbers
in your journal.**

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

**Picture
Puzzles**

more

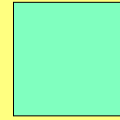
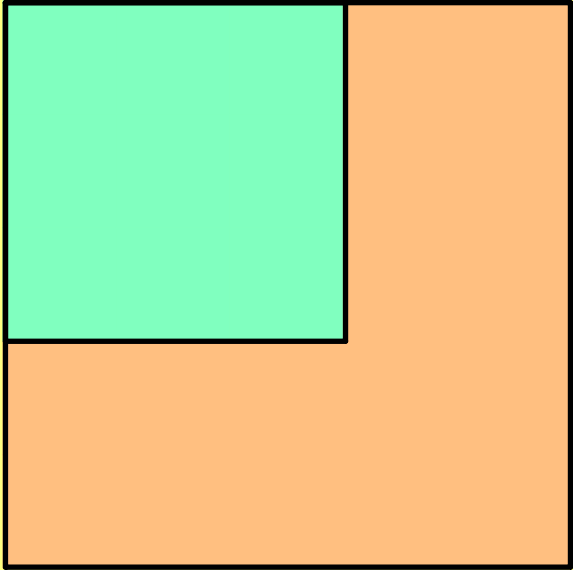
**Picture
Puzzles**

Picture Puzzles

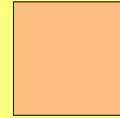
To Do

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.

Picture Puzzles

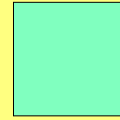
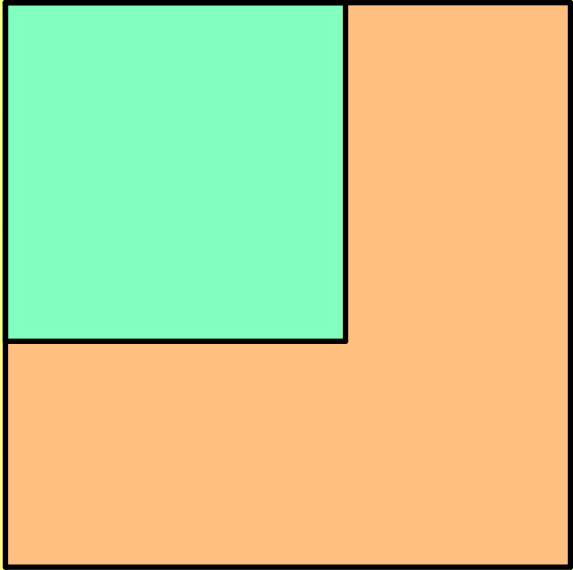


S_3 on top

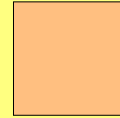


S_5 below

Picture Puzzles



S_3 on top

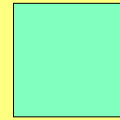
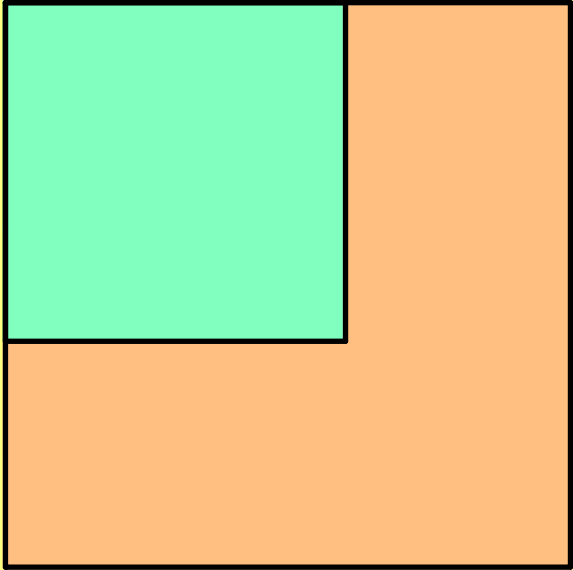


S_5 below

$S_5 - S_3$

=

Picture Puzzles



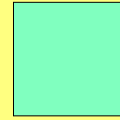
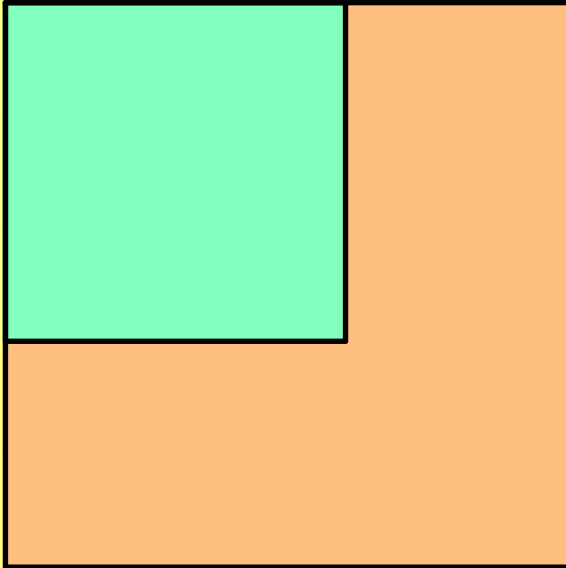
S_3 on top



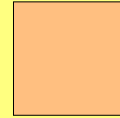
S_5 below

$$\begin{aligned} S_5 - S_3 \\ = 25 - 9 \\ = \end{aligned}$$

Picture Puzzles



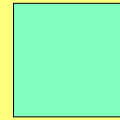
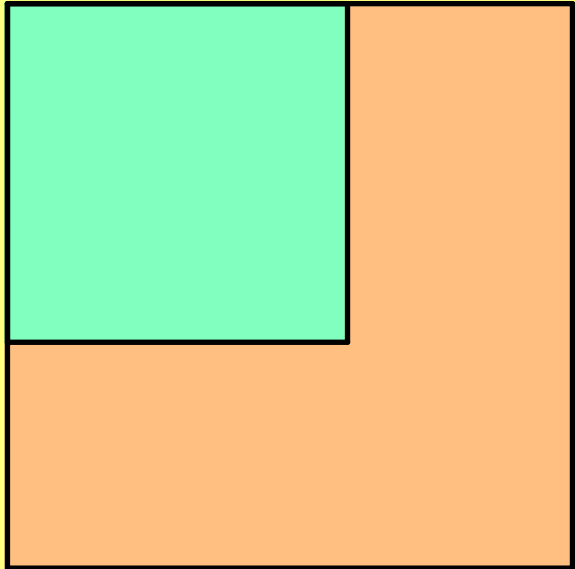
S_3 on top



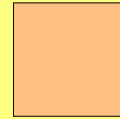
S_5 below

$$\begin{aligned} S_5 - S_3 \\ &= 25 - 9 \\ &= 16 \end{aligned}$$

Picture Puzzles



S_3 on top

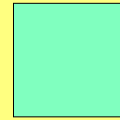
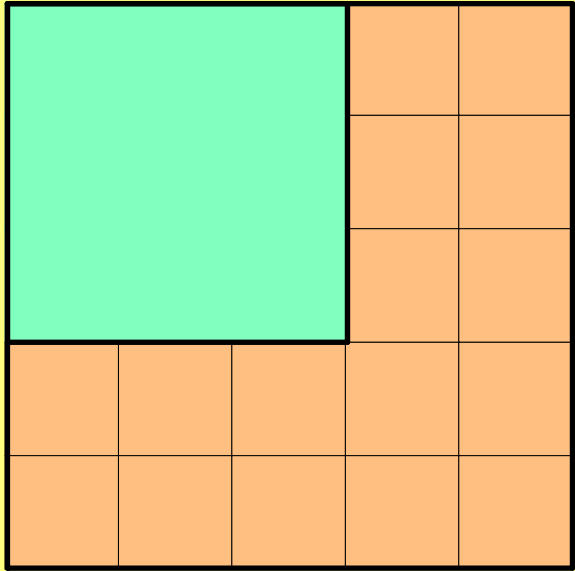


S_5 below

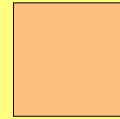
$$\begin{aligned} S_5 - S_3 \\ &= 25 - 9 \\ &= 16 \end{aligned}$$

Difference
between
two squares

Picture Puzzles

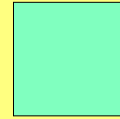
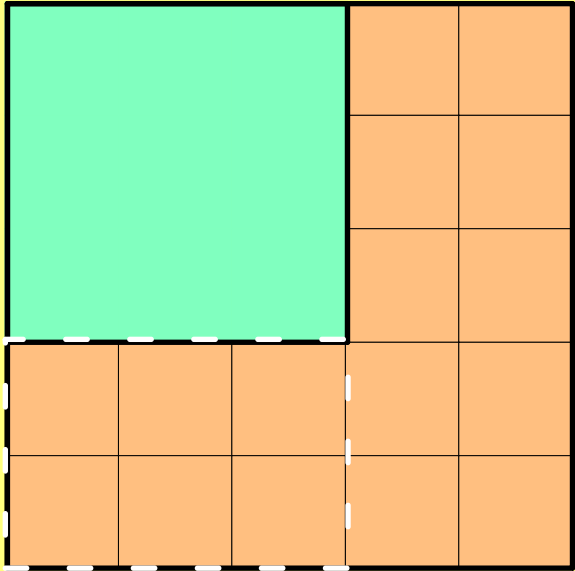


S_3 on top

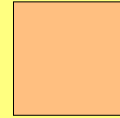


S_5 below

Picture Puzzles

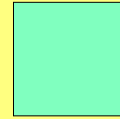
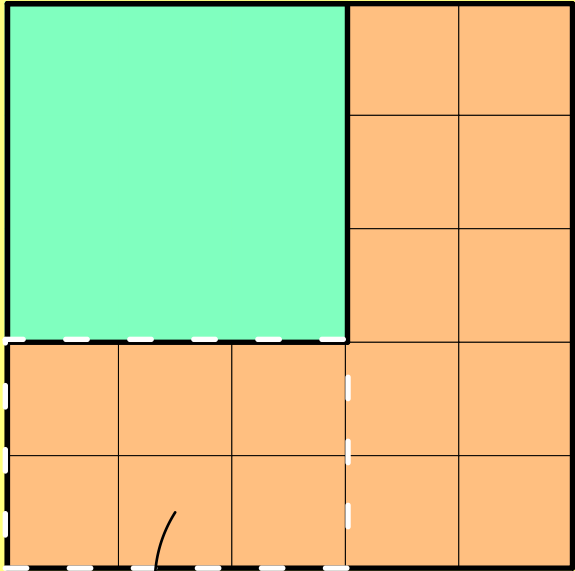


S_3 on top

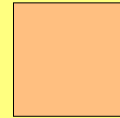


S_5 below

Picture Puzzles

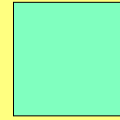
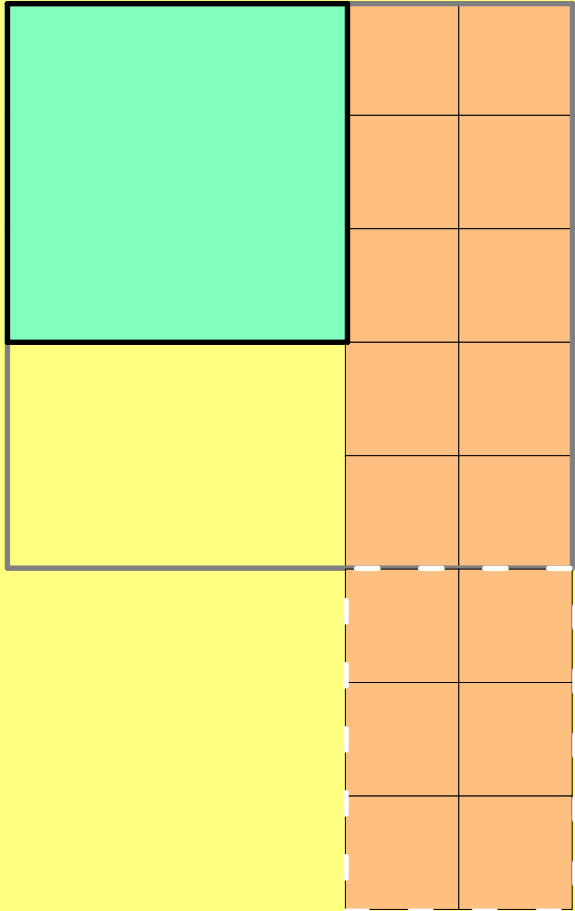


S_3 on top

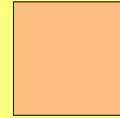


S_5 below

Picture Puzzles

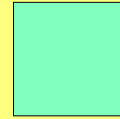
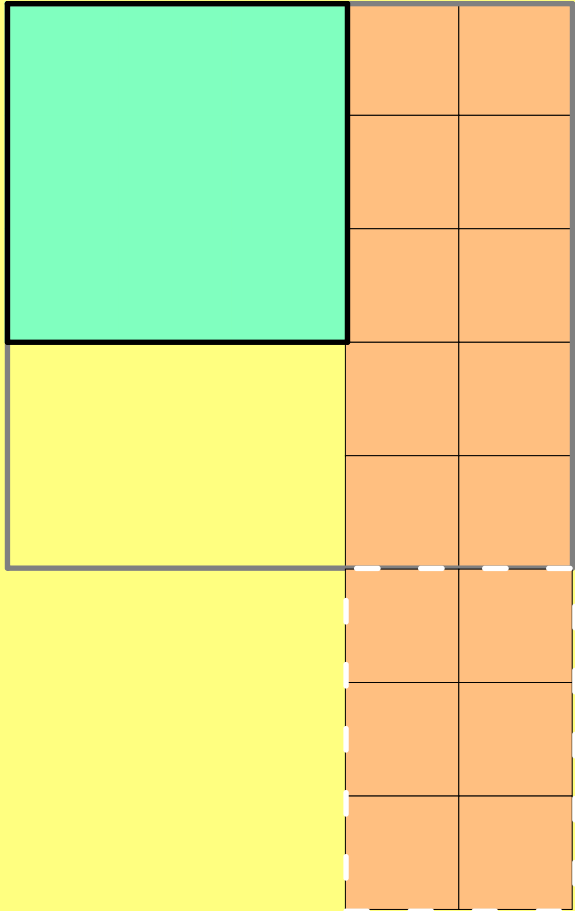


S_3 on top

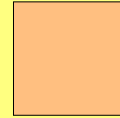


S_5 below

Picture Puzzles



S_3 on top

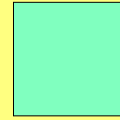
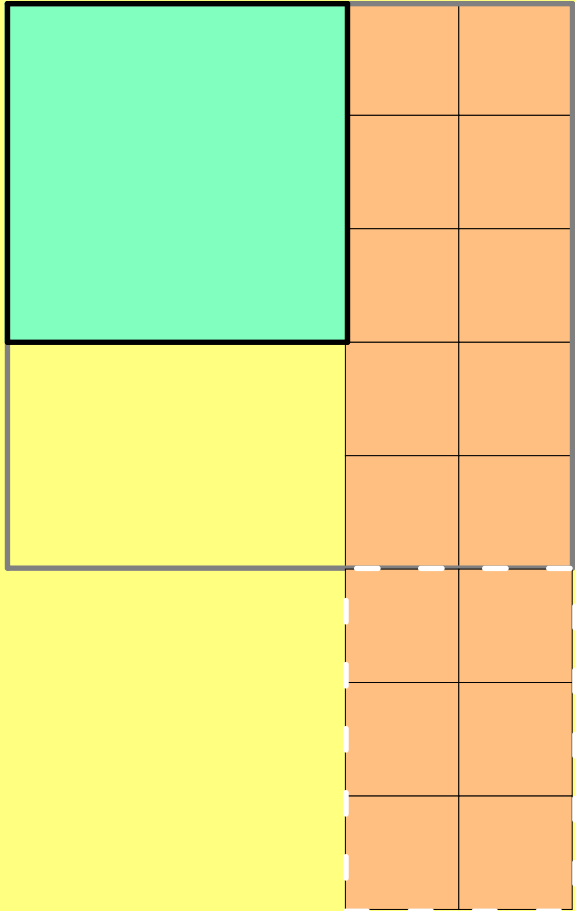


S_5 below

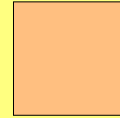
$S_5 - S_3$

=

Picture Puzzles



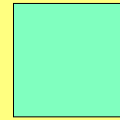
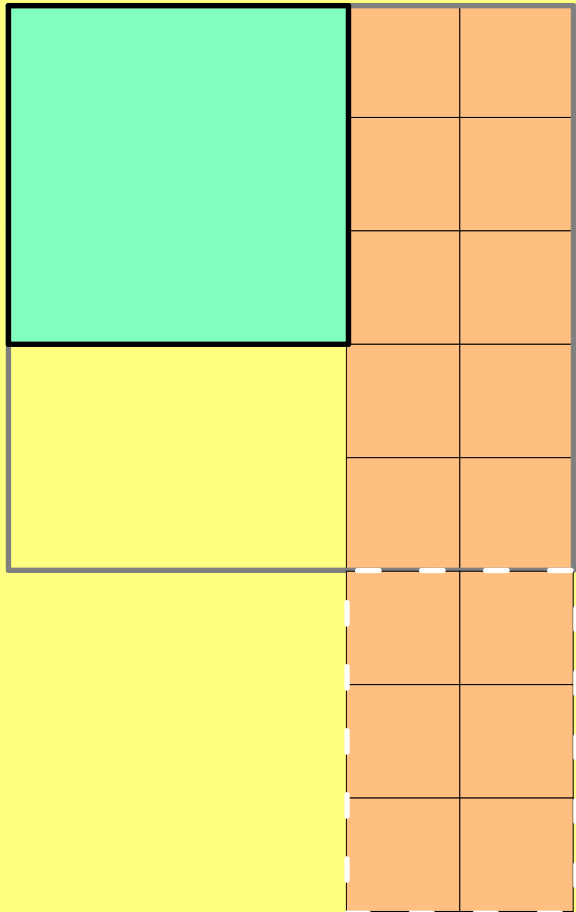
S_3 on top



S_5 below

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

Picture Puzzles



S_3 on top



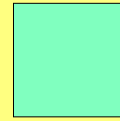
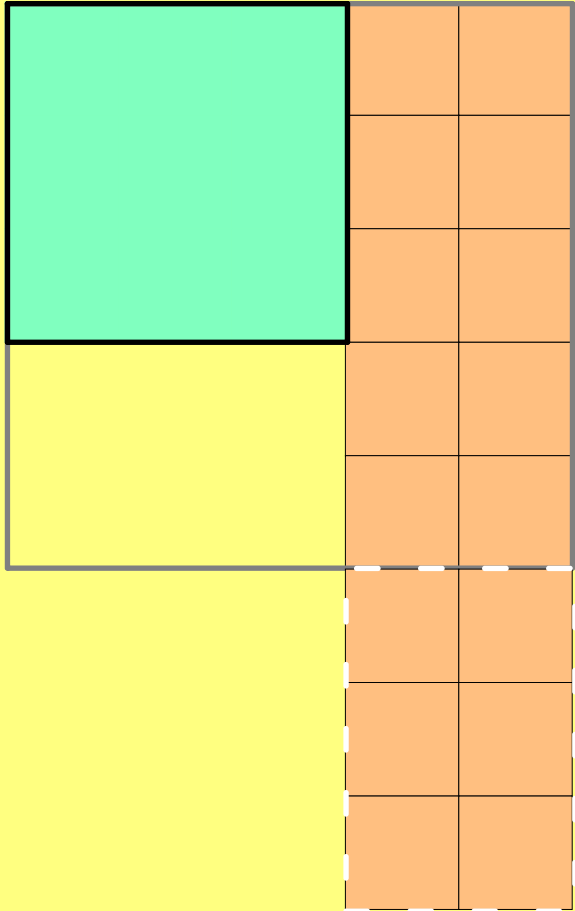
S_5 below

$$S_5 - S_3$$

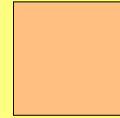
$$= (5 + 3) (5 - 3)$$

Where do these two
factors come from?

Picture Puzzles



S_3 on top



S_5 below

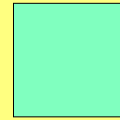
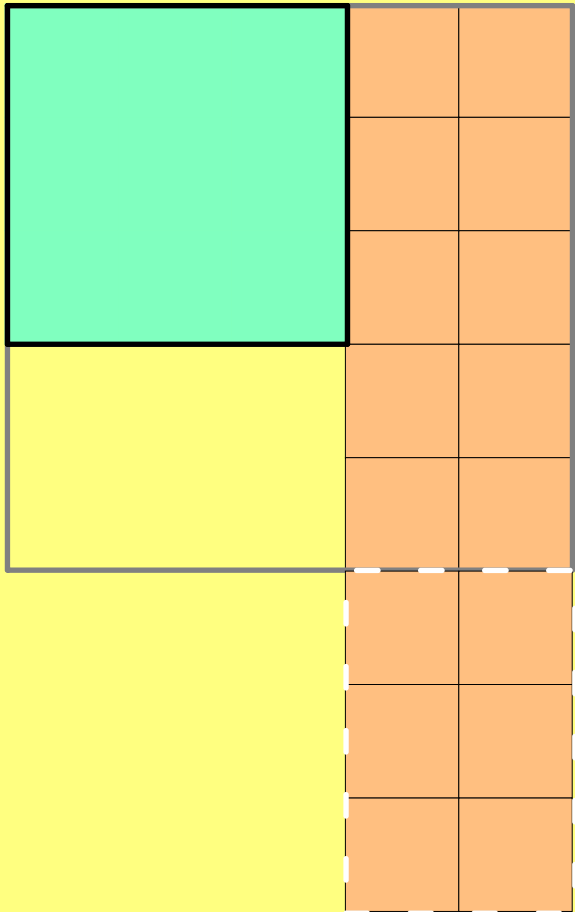
$$S_5 - S_3$$

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

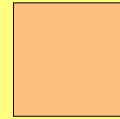
$$= 8 \times 2$$

$$= 16$$

Picture Puzzles



S_3 on top



S_5 below

$S_5 - S_3$

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

$$= 8 \times 2$$

$$= 16$$

Difference
between
two squares

Choose two other squares.

Find their difference in two ways.

**If I tell you the size of any two squares,
Can you tell me their difference in two ways?**

Picture Puzzles

THE END...

...OR IS IT?

Picture
Puzzles