

Cuboid Challenge

The cuboid challenge is a live challenge set on n-rich, and we have to find out :

What is the volume of your box?
What different volumes can you make by varying the size of the squares you cut out?

What is the maximum possible volume of this type of box that can be made from a 20cm by 20cm square of paper?

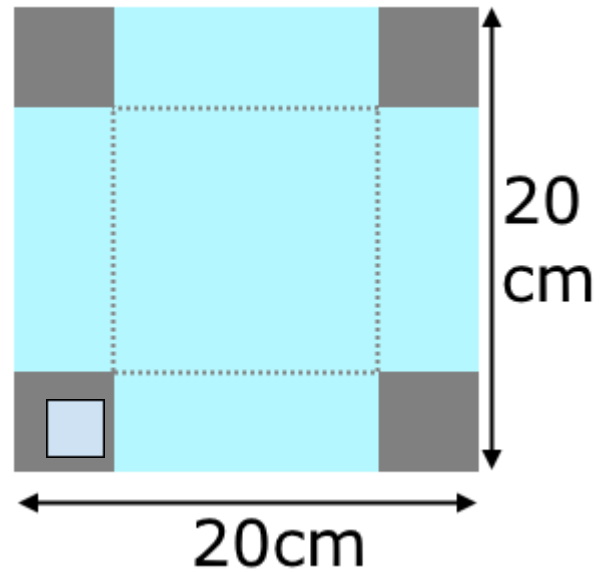
Now try starting with different sized square sheets of paper.

Can you find a relationship between the size of paper and the size of the square cut-out that produces the maximum volume?

We found that to find the volume of the box is $x(20-2x)^2$

This table tells us that the maximum volume for whole numbers is...

X as....	Volume
X as 1	$1(20-2)^2 = 324\text{cm}^3$
X as 2	$2(20-4)^2 = 512\text{cm}^3$
X as 3	$3(20-6)^2 = \underline{588\text{cm}^3}$
X as 4	$4(20-8)^2 = 576\text{cm}^3$
X as 5	$5(20-10)^2 = 500\text{cm}^3$
X as 6	$6(20-12)^2 = 384\text{cm}^3$
X as 7	$7(20-14)^2 = 252\text{cm}^3$
X as 8	$8(20-16)^2 = 128\text{cm}^3$
X as 9	$9(20-18)^2 = 36\text{cm}^3$



To prove this, there is a link to our evidence:

<https://docs.google.com/spreadsheets/d/12yuWtm3YbV3TbwkM8v-Uz7QK9gZPv3AOxTVGeKkBff4/edit?usp=sharing>

We found that the biggest is actually a volume of **592.5925881cm³**. The length of the small square is 3⅓cm.

If you did a square of length of 15 cm, the results would be like this...

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X as 1	$1(15-2)^2 = 169\text{cm}^3$
X as 2	$2(15-4)^2 = 242\text{cm}^3$
X as 3	$3(15-6)^2 = 243\text{cm}^3$
X as 4	$4(15-8)^2 = 196\text{cm}^3$
X as 5	$5(15-10)^2 = 125\text{cm}^3$
X as 6	$6(15-12)^2 = 54\text{cm}^3$
X as 7	$7(15-14)^2 = 7\text{cm}^3$

The results are the same for this experiment, the biggest volume is **592.592148cm³**. The length of the small square is also 3⅓cm.

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