# Answer on Question #57586 – Math – Geometry

Question

A rectangular piece of cardboard 18 in. by 23 in. is made into a box with an open top by cutting a square of side 4 inches from each corner and folding up the sides. What is the volume of the box in cubic inches?
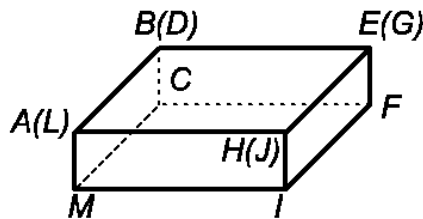
Solution

The following picture shows the cardboard before and after cutting. The dotted line performs the cutting line.
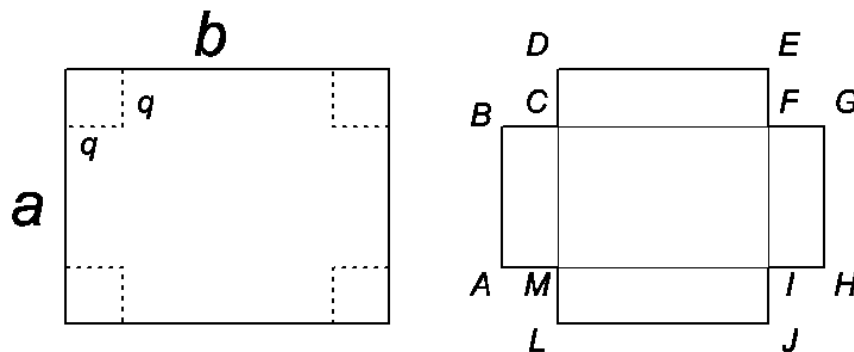
Let a=18 in., b=23 in., q=4 in.

Therefore the box made of this piece will be like this:

So, we have a rectangular parallelepiped with the base MCFI and the height, for example, AM. The volume can be found as

$$V = S_b \cdot h = S_{\text{MCFI}} \cdot AM = MC \cdot MI \cdot AM.$$

Let's find the values of these sides.

$$MC = a - 2q = 18 - 2 \cdot 4 = 18 - 8 = 10 \ (in.)$$
$$MI = b - 2q = 23 - 2 \cdot 4 = 23 - 8 = 15 \ (in.)$$
$$MC = q = 4 \ (in.)$$

So, the volume of the box is

$$V = MC \cdot MI \cdot AM = 10 \cdot 15 \cdot 4 = 600 \ (in^3).$$

Answer: $V = 600 \ in^3$.