

Geometry: Computer Manufacturer – Electrician Electrical Company

Problem:

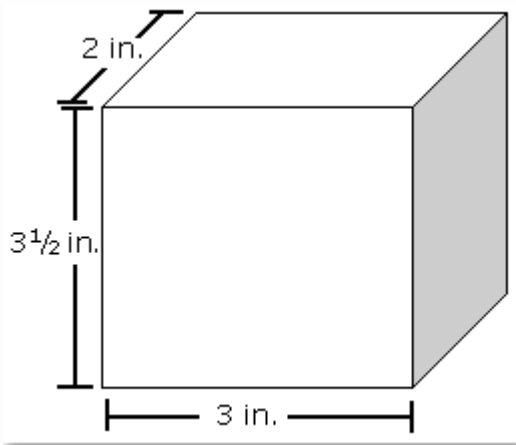
When an electrician wires a house, the switch boxes must be properly sized.

Each insulated wire (wire size called #14) requires 2.25 cubic inches of space.

Any number of bare wires all together only needs another 2.25 cubic inches of space.

Each cable contains two (2) insulated and one (1) bare wire.

How many cables can be put into a box that is 3 inches deep?



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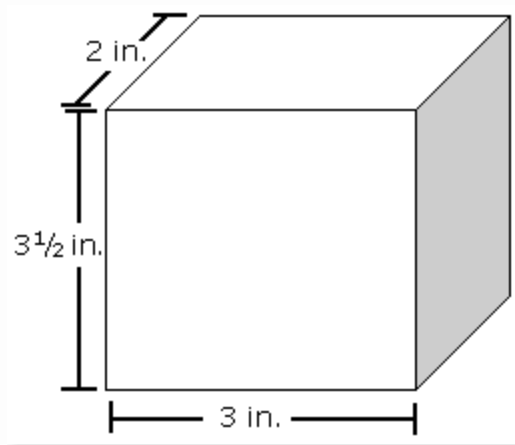
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Solution:

Box volume is $3" \times 3.5" \times 2"$ or 21 in^3

Space needed for insulated wires:

$$21 \text{ in}^3 - 2.25 \text{ in}^3 = 18.75 \text{ in}^3$$

(all bare wires need only 2.25 in^3).

Space needed for each cable that contains two insulated wires:

$$2.25 \text{ in}^3 \times 2 = 4.50 \text{ in}^3$$

Maximum number of cables allowed:

$$18.75 \text{ in}^3 \div 4.50 \text{ in}^3 = 4.166\dots$$

Therefore, 4 cables can be put into the box.