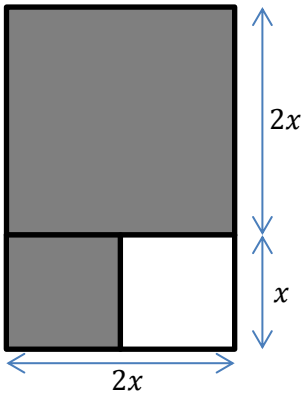
Shaded squares 1

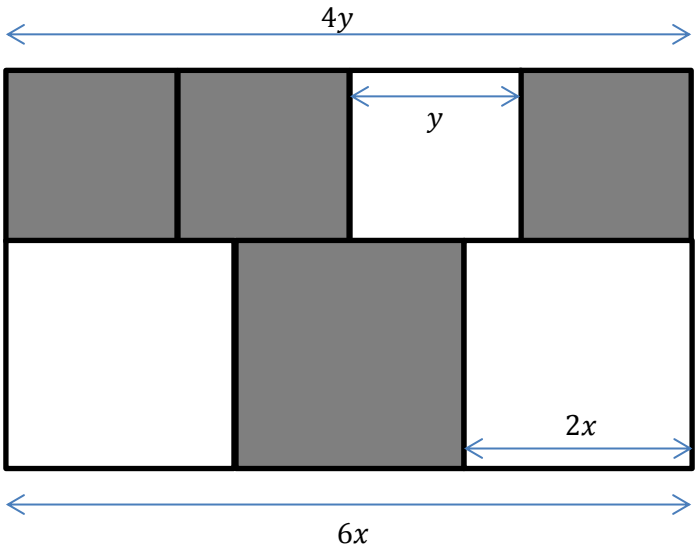
There are three sizes of square in the design.

Let the length of one side of the smallest type of square be x

The length of one side of the largest type of square is therefore $2x$

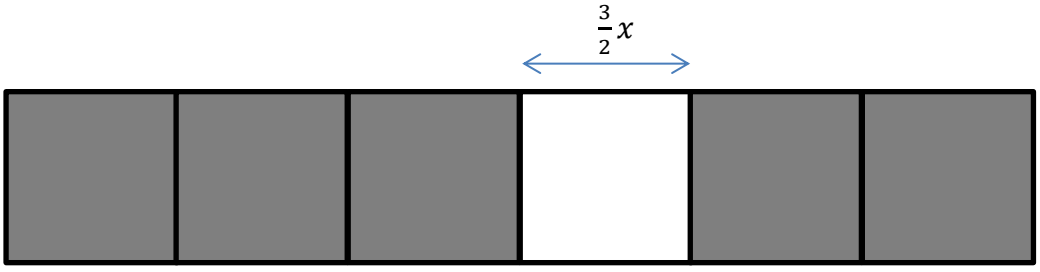


Let the length of one side of the middle type of square be y



So $4y = 6x \Rightarrow y = \frac{3}{2}x$

The length of one side of the middle type of square is $\frac{3}{2}x$



The length of one side of the overall design is therefore $= 6 \times \frac{3}{2}x = 9x$

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Area of overall design $= 9x \times 9x = 81x^2$

Area of a small square $= x^2$

Area of a middle square $= \frac{3}{2}x \times \frac{3}{2}x = \frac{9}{4}x^2$

Area of a large square $= 2x \times 2x = 4x^2$

Shaded area:

Two small squares $= 2x^2$

Four large squares $= 4 \times 4x^2 = 16x^2$

Fifteen middle squares $= 15 \times \frac{9}{4}x^2 = \frac{135}{4}x^2$

Total shaded area $= 2x^2 + 16x^2 + \frac{135}{4}x^2 = 51.75x^2$

Percentage of design shaded $= \frac{51.75x^2}{81x^2} \times 100 = 63.9\%$ (3 s.f.)

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