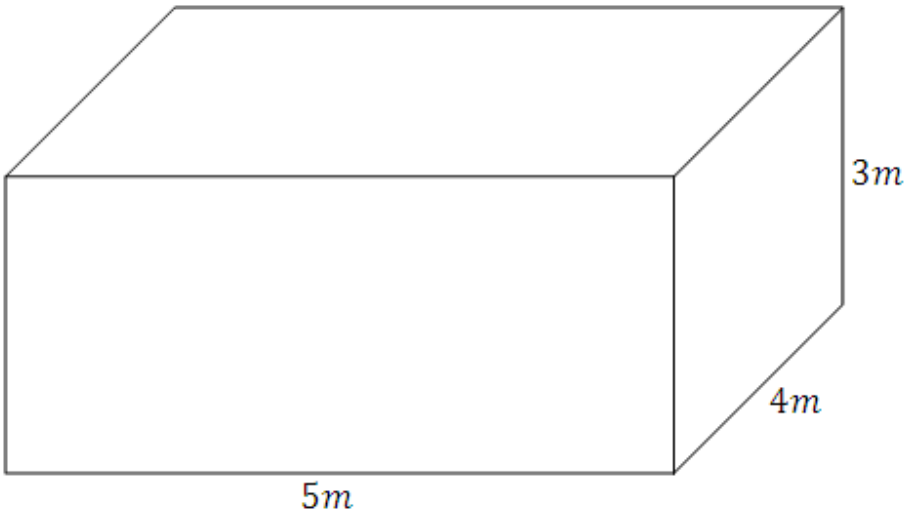
# Bounds

The diagram below shows a room which is to be painted (walls and ceiling). Rough measurements have been taken and are correct to the nearest metre.




1. Calculate an estimate for the area to be painted, using the measurements given.

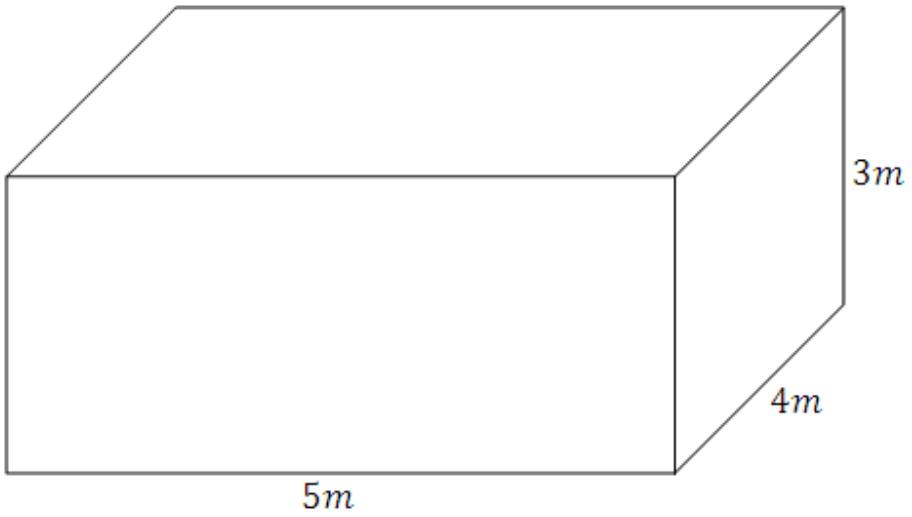
2. Paint comes in 2.5 litre tins which cost £18 and cover $25m^2$ of area. Find an upper bound for the cost of painting this room.

3. Calculate a minimum value for the amount of paint, in litres, needed for the room.

4. Enough tins of paint are bought to be certain of having enough. What is the maximum possible quantity of paint left over?

# Bounds Solutions

The diagram below shows a room which is to be painted (walls and ceiling). Rough measurements have been taken and are correct to the nearest metre.




1. Calculate an estimate for the area to be painted, using the measurements given.

$Walls$: $2 \times (5 \times 3) + 2 \times (4 \times 3) = 54m^2$
$Ceiling$: $5 \times 4 = 20m^2$
$Total$: $54 + 20 = \mathbf{74m^2}$

2. Paint comes in 2.5 litre tins which cost £18 and cover $25m^2$ of area. Find an upper bound for the cost of painting this room.

$Walls\ Upper\ Bound$: $2 \times (5.5 \times 3.5) + 2 \times (4.5 \times 3.5) = 70m^2$
$Ceiling\ Upper\ Bound$: $5.5 \times 4.5 = 24.75m^2$
$Total\ Upper\ Bound$: $70 + 24.75 = 94.75m^2$ $which\ means$ $4\ tins$: **£72**

3. Calculate a minimum value for the amount of paint, in litres, needed for the room.

$Walls\ Lower\ Bound$: $2 \times (4.5 \times 2.5) + 2 \times (3.5 \times 2.5) = 40m^2$
$Ceiling\ Lower\ Bound$: $4.5 \times 3.5 = 15.75m^2$
$Total\ Lower\ Bound$: $40 + 15.75 = 55.75m^2$ $which\ means$ $\mathbf{5.575\ litres}$

4. Enough tins of paint are bought to be certain of having enough. What is the maximum possible quantity of paint left over?

$4\ tins\ bought = 10\ litres.\ Minimum\ used = 5.575\ litres.$
$Paint\ left\ over = 10 - 5.575 = \mathbf{4.425\ litres}$