# Nets and Surface Area

Nets and surface area: Applications and decisions

**Name** _____ **Date** _____ **Score** _____ / 6

**QUICK REVIEW**

A net unfolds every outside face. Opposite faces of a rectangular prism are congruent, so $S = 2(lw + lh + wh)$. A cube with $2$ cm edges has area $6(2 \times 2) = 24$ cm$^2$. For an open box, count one base and four walls, with no lid.

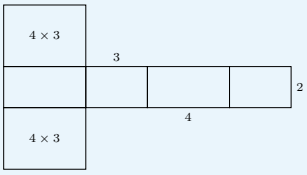
**Worked example**

Use the net to find total surface area. Dimensions are $4 \times 3 \times 2$ cm.

**1.** One face of each size: $4 \times 3 = 12$, $4 \times 2 = 8$, $3 \times 2 = 6$ cm$^2$.

**2.** Opposite faces are congruent: each pair has the same two edge lengths. Count each area twice: $2(12 + 8 + 6) = 52$ cm$^2$.

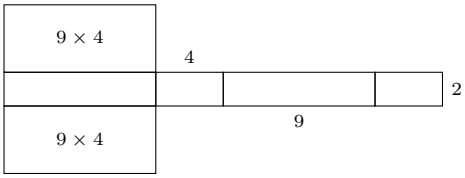
**Answer:** $52$ cm$^2$.



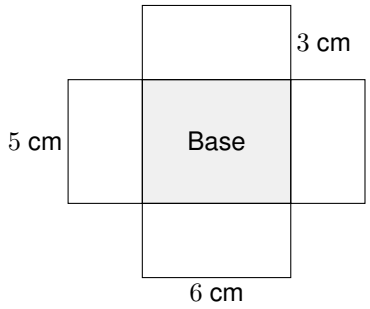

## Practice Problems

Show your thinking.

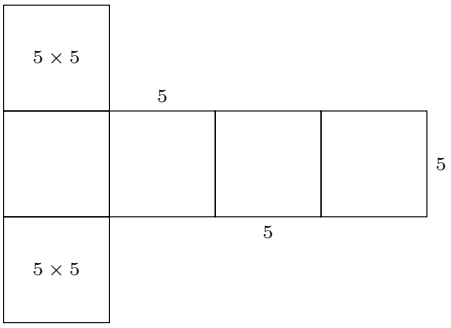
**1.** Find wrapping-paper area for a box, ignoring overlap. Dimensions are $9 \times 4 \times 2$ cm.



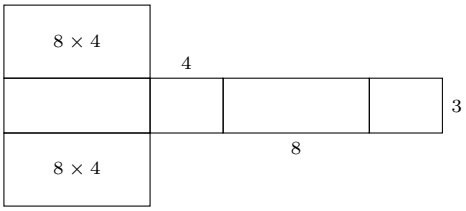

**2.** Use this net as a pattern for two identical open trays. Find the area for one tray and for both, ignoring tabs and overlap.




**3.** Find total paintable area of a cube, including its bottom. Dimensions are $5 \times 5 \times 5$ cm.

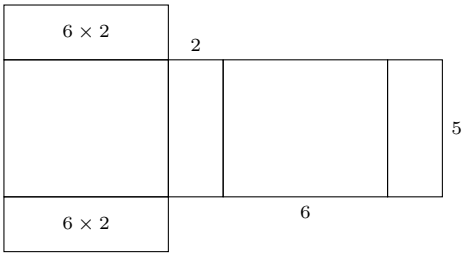



**4.** A $200$-square-cm sheet is available. Find required area and decide if it is enough by area alone. Dimensions are $8 \times 4 \times 3$ cm.




**5.** An open tray has a $7$ cm by $3$ cm base and $101$ cm$^2$ of material, with no lid or overlap. Find its wall height.

**6.** A label counts only the front face. Correct the total outside area. Dimensions are $6 \times 2 \times 5$ cm.



# Answer Key

1. $124$ cm$^2$.
2. $96$ cm$^2$. Both trays: $192$ cm$^2$.
3. $150$ cm$^2$.
4. $136$ cm$^2$. Yes: $200 - 136 = 64$ cm$^2$ spare by area.
5. $4$ cm.
6. $104$ cm$^2$.

## Step-by-Step Solutions

Follow each calculation, then check your own work.

### Problem 1

**1.** One face of each size: $9 \times 4 = 36$, $9 \times 2 = 18$, $4 \times 2 = 8$ cm$^2$.

**2.** Opposite faces are congruent: each pair has the same two edge lengths. Count each area twice: $2(36 + 18 + 8) = 124$ cm$^2$.

### Problem 2

**1.** One base: $6 \times 5 = 30$ cm$^2$. There is no lid.

**2.** Two long walls: $2(6 \times 3) = 36$ cm$^2$. Two end walls: $2(5 \times 3) = 30$ cm$^2$.

**3.** Add all five faces: $30 + 36 + 30 = 96$ cm$^2$.

**4.** Two identical trays use $2 \times 96 = 192$ cm$^2$.

### Problem 3

**1.** One face of each size: $5 \times 5 = 25$, $5 \times 5 = 25$, $5 \times 5 = 25$ cm$^2$.

**2.** Opposite faces are congruent: each pair has the same two edge lengths. Count each area twice: $2(25 + 25 + 25) = 150$ cm$^2$.

**3.** Equivalently, all six squares have area $25$ cm$^2$, so $6 \times 25 = 150$ cm$^2$.

### Problem 4

**1.** One face of each size: $8 \times 4 = 32$, $8 \times 3 = 24$, $4 \times 3 = 12$ cm$^2$.

**2.** Opposite faces are congruent: each pair has the same two edge lengths. Count each area twice: $2(32 + 24 + 12) = 136$ cm$^2$.

**3.** The requirement is $2(32 + 24 + 12) = 136$ cm$^2$; $200 - 136 = 64$ remains. This does not guarantee net placement will fit.

### Problem 5

**1.** Base area is $7 \times 3 = 21$ cm$^2$. The four walls use $101 - 21 = 80$ cm$^2$.

**2.** The wall lengths total $7 + 3 + 7 + 3 = 20$ cm. All walls have the same height: $80 \div 20 = 4$ cm.

**3.** Check: $21 + 20 \times 4 = 101$ cm$^2$.

### Problem 6

**1.** One face of each size: $6 \times 2 = 12$, $6 \times 5 = 30$, $2 \times 5 = 10$ cm$^2$.

**2.** Opposite faces are congruent: each pair has the same two edge lengths. Count each area twice: $2(12 + 30 + 10) = 104$ cm$^2$.

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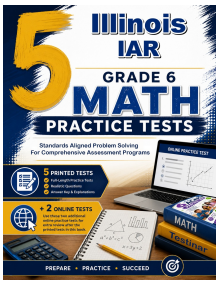


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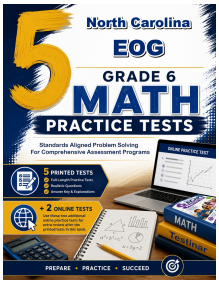


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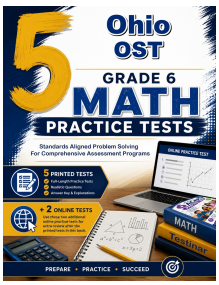


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