

Wrapping the Perfect Gift

The purpose for reading is to understand the steps for finding total surface area so you can determine how much material is needed to cover a new package.

Pay Attention To:

- How each face of a shape is included in total surface area
- The role of the Base and how it is calculated
- How the lateral surface area contributes to the total
- The steps used to combine all areas together
- Why finding total surface area is important in real-world situations

total surface area

TOTAL SURFACE AREA OF A RECTANGULAR PRISM

Base
lateral face
 $l = 8 \text{ in}$
 $w = 4 \text{ in}$
 $h = 5 \text{ in}$
6 total sides

total surface area (S) = $2(lw + lh + wh)$
 $S = 2((8 \times 4) + (8 \times 5) + (4 \times 5))$
 $S = 2(32 + 40 + 20)$
 $S = 2(92)$
 $S = 184 \text{ in}^2$

TOTAL SURFACE AREA OF A RECTANGULAR PYRAMID

Base
lateral face
 $l = 4 \text{ in}$
 $w = 4 \text{ in}$
 $s = 6 \text{ in}$
5 total sides

area of the base = $l \times w$
 area of the base = 4×4
 area of the base = 16 in^2
 lateral surface area = $4 \left(\frac{1}{2}bh\right)$
 lateral surface area = $4 \left(\frac{1}{2} \times 4 \times 6\right)$
 lateral surface area = 48 in^2
 total surface area = $16 + 48$
 total surface area = 64 in^2

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A company is making gift boxes shaped like a rectangular prism and a rectangular pyramid, like the ones in the visual. Each box has a **Base** and side faces called the **lateral surface area**. The designers want to cover the whole outside of each box with paper. They need to find the **total surface area** to know how much paper to use.

To find the **total surface area**, the designers find the area of each face. First, they find the area of the **Base**. Then, they find the areas of the faces in the **lateral surface area**. The rectangular prism has rectangle faces, and the pyramid has triangle faces. They add all the areas together to get the **total surface area**.

Now a designer is making a new box shaped like a triangular prism for candles. The designer wants to cover the whole box with paper. The designer needs to think about the **total surface area** of the new shape. This will help make sure all sides are covered.

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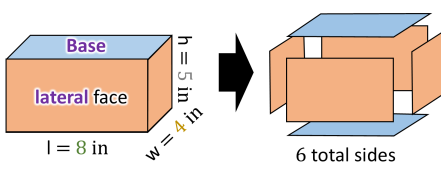
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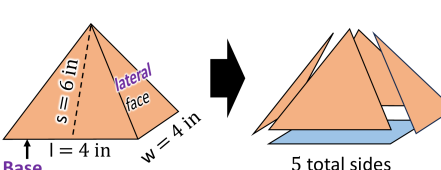
TOTAL SURFACE AREA OF A RECTANGULAR PRISM



Base
lateral face
 $l = 8 \text{ in}$
 $w = 4 \text{ in}$
 $h = 5 \text{ in}$
6 total sides

total surface area (S) = $2(lw + lh + wh)$
 $S = 2((8 \times 4) + (8 \times 5) + (4 \times 5))$
 $S = 2(32 + 40 + 20)$
 $S = 2(92)$
 $S = 184 \text{ in}^2$

TOTAL SURFACE AREA OF A RECTANGULAR PYRAMID



Base
lateral face
 $l = 4 \text{ in}$
 $w = 4 \text{ in}$
 $s = 6 \text{ in}$
5 total sides

area of the base = $l \times w$
area of the base = 4×4
area of the base = 16 in^2
lateral surface area = $4 \left(\frac{1}{2}bh\right)$
lateral surface area = $4 \left(\frac{1}{2} \times 4 \times 6\right)$
lateral surface area = 48 in^2
total surface area = $16 + 48$
total surface area = 64 in^2

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A company is designing gift boxes shaped like a rectangular prism and a rectangular pyramid, just like the ones shown in the visual. Each box has a **Base** and several faces that make up the **lateral surface area**. The designers need to cover every outside face of the boxes with decorative material. To do this, they must determine the **total surface area** so they know how much material is required.

To find the **total surface area**, the designers calculate the area of each face of the shape. They begin by finding the area of the **Base**. Then, they find the areas of the faces that make up the **lateral surface area**. For the rectangular prism, they calculate each rectangular face, and for the pyramid, they calculate each triangular face. After finding all the areas, they add them together to get the **total surface area**.

Now imagine a designer creating a new package shaped like a triangular prism for a set of candles. The designer wants to completely cover the package with decorative paper so that all faces are included. Before creating the packaging, the designer needs to think about the **total surface area** of this new shape. This will help ensure

the entire outside is covered.



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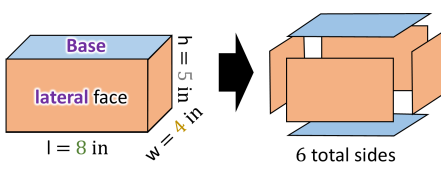
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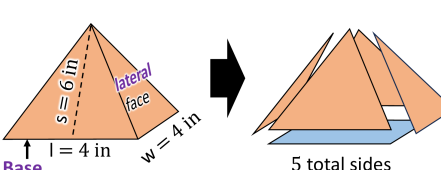
TOTAL SURFACE AREA OF A RECTANGULAR PRISM



Base
lateral face
l = 8 in
w = 4 in
h = 5 in
6 total sides

total surface area (S) = 2 (lw + lh + wh)
 $S = 2 ((8 \times 4) + (8 \times 5) + (4 \times 5))$
 $S = 2 (32 + 40 + 20)$
 $S = 2 (92)$
 $S = 184 \text{ in}^2$

TOTAL SURFACE AREA OF A RECTANGULAR PYRAMID



Base
lateral face
s = 6 in
l = 4 in
w = 4 in
5 total sides

area of the base = l × w
 area of the base = 4 × 4
 area of the base = 16 in²
 lateral surface area = 4 (½bh)
 lateral surface area = 4 (½ × 4 × 6)
 lateral surface area = 48 in²
 total surface area = 16 + 48
 total surface area = 64 in²

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A company is designing gift boxes in the form of a rectangular prism and a rectangular pyramid, as shown in the visual. Each three-dimensional figure includes a **Base** and multiple faces that contribute to the **lateral surface area**. The designers must account for every exterior face because the entire surface will be covered with decorative material. Determining the **total surface area** allows them to calculate the exact amount of material needed.

To determine the **total surface area**, the designers calculate the area of each individual face. They start with the **Base**, then calculate the areas of all faces included in the **lateral surface area**. In a rectangular prism, these faces are rectangles, while in a pyramid, they are triangular faces surrounding the base. Once each area is calculated, the values are combined to produce the **total surface area**. This process ensures that no part of the figure is left unaccounted for.

Consider a designer developing a new package shaped like a triangular prism for a candle set. The goal is to fully cover the package with a printed design that reaches

every surface. Before production begins, the designer must consider the **total surface area** of this new figure. This ensures the design will extend across all faces without leaving any gaps.

