

Surface Area of Prisms | MFM2P

Surface Area - In general, the surface area is the sum of all the areas of all the shapes that cover the surface of the object.

Today we will find surface areas by making a "net" of the 3D shapes, and also by using a formula. We will only be looking at the surface area of prisms in detail.

Example 1: Find the surface area of this rectangular prism.

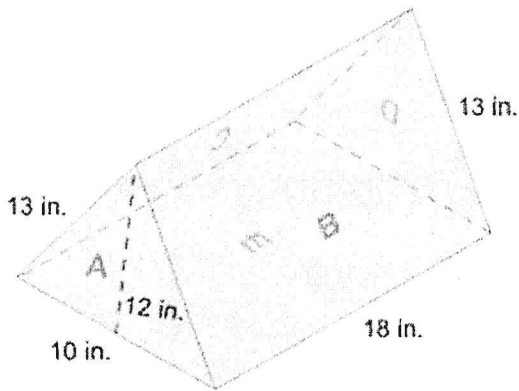
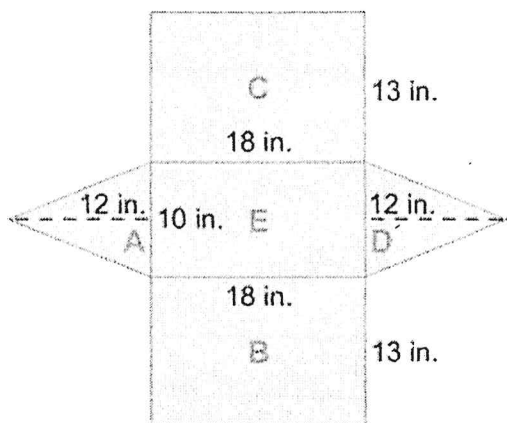
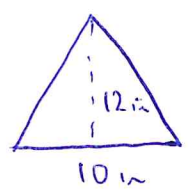
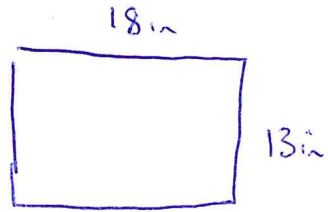
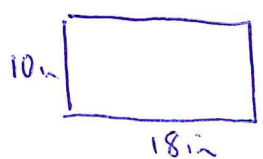
Method 1: Use a net and a table		
<p>Shape:</p>	<p>Net:</p>	
Basic Shape #1	Basic Shape #2	Basic Shape #3
Area = $3 \times 6 = 18 \text{ cm}^2$	Area = $2 \times 3 = 6 \text{ cm}^2$	Area = $2 \times 6 = 12 \text{ cm}^2$
Total Area (2 of each rectangle) = $2(18) + 2(6) + 2(12) = 72 \text{ cm}^2$		

Method 2: Use the formula $SA = 2(l \times w + l \times h + w \times h)$

$$\begin{aligned}
 &= 2(6 \times 3 + 6 \times 2 + 3 \times 2) \\
 &= 2(18 + 12 + 6) \\
 &= 2(36) \\
 &= 72 \text{ cm}^2
 \end{aligned}$$

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Example 2: Find the surface area of this triangular prism.

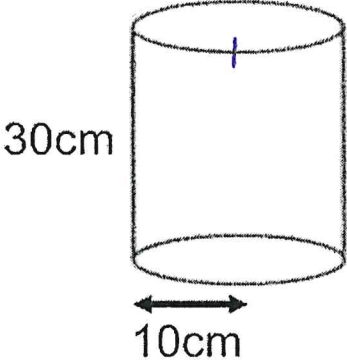
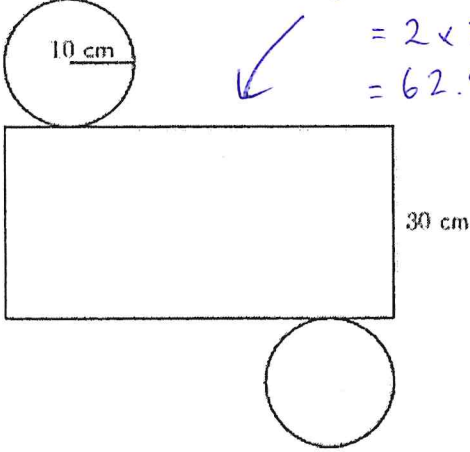
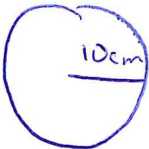
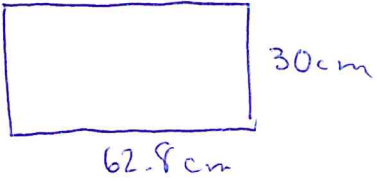
Method 1: Use a net and a table		
Shape: 	Net: 	
Basic Shape #1 (A/D)	Basic Shape #2 (B/C)	Basic Shape #3 (E)
		
Area = $10 \times 12 \div 2 = 60 \text{ in}^2$	Area = $18 \times 13 = 234 \text{ in}^2$	Area = $10 \times 18 = 180 \text{ in}^2$
Total Area (2 of each triangle, and 3 rectangular sides) = $60 + 60 + 234 + 234 + 180 = 768 \text{ in}^2$		

Method 2: Use the formula $SA = ah + bh + ch + bl$

$$\begin{aligned}
 a &= 13 & & = 13 \times 18 + 10 \times 18 + 13 \times 18 + 10 \times 12 \\
 b &= 10 & & = 234 + 180 + 234 + 120 \\
 c &= 13 & & \\
 h &= 18 & & = 768 \text{ in}^2 \\
 l &= 12 & &
 \end{aligned}$$

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Example 3: Find the surface area of this cylinder

Method 1: Use a net and a table	
<p>Shape:</p> 	<p>Net:</p>  <p> $C = 2 \times \pi \times r$ $= 2 \times 3.14 \times 10$ $= 62.8 \text{ cm}$ </p>
Basic Shape #1	Basic Shape #2
	
Area = $3.14 \times 10^2 = 314 \text{ cm}^2$	Area = $30 \times 62.8 = 1,884 \text{ cm}^2$
Total Area (2 circles and the rectangle) = $314 + 314 + 1884 = 2,512 \text{ cm}^2$	

Method 2: Use the formula $SA = 2 \times \pi \times r^2 + 2 \times \pi \times r \times h$

$$\begin{aligned}
 &= 2 \times 3.14 \times 10^2 + 2 \times 3.14 \times 10 \times 30 \\
 &= 628 + 1,884 \\
 &= 2,512 \text{ cm}^2
 \end{aligned}$$

