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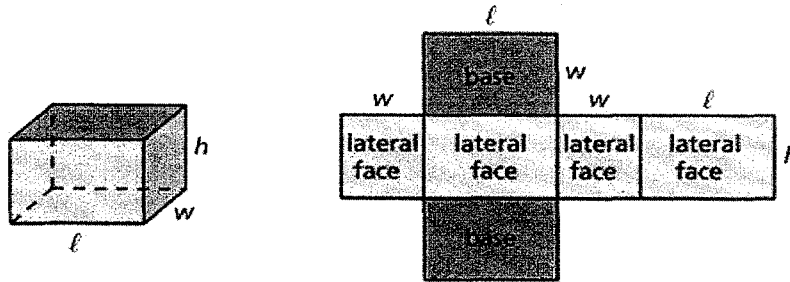
SURFACE AREA & VOLUME

PERIOD: \_\_\_\_\_

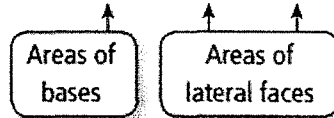
## How Do You Find Surface Area of a Prism?

(Topic #1)

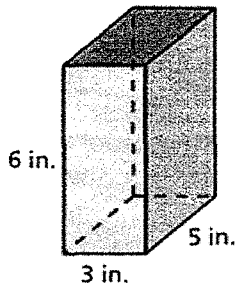
The surface area of a rectangular box is the sum of the areas of its six rectangular sides.



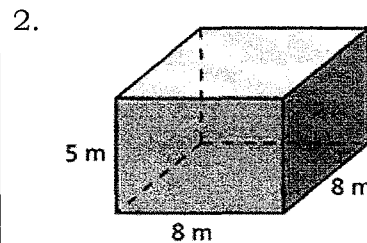
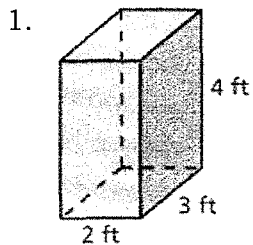
**Algebra**  $S = 2\ell w + 2\ell h + 2wh$



### **EXAMPLE 1:** Finding the Surface Area of a Rectangular Prism

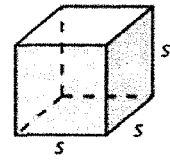


### **PRACTICE:** Find the surface area of the prism.

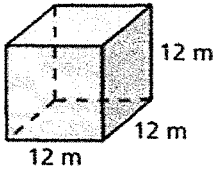


When all the edges of a rectangular prism have the same length  $s$ , the rectangular prism is a cube.

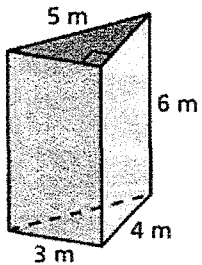
$$\text{Surface Area of a Cube} = 6s^2$$



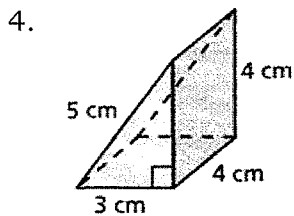
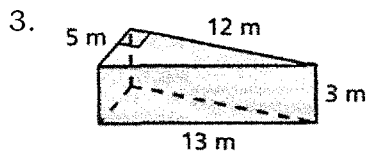
**EXAMPLE 2: Finding the Surface Area of a Cube**



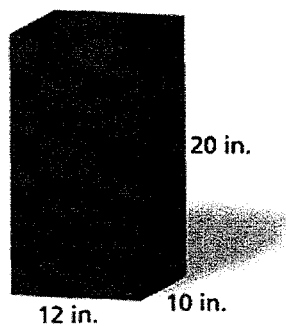
**EXAMPLE 3: Finding the Surface Area of a Triangular Prism**



**PRACTICE: Find the surface area of the prism.**



**EXAMPLE 4: Real-Life Application**



The outsides of purple traps are coated with glue to catch emerald ash borers. You make your own trap in the shape of a rectangular prism with an open top and bottom. What is the surface area that you need to coat with glue?

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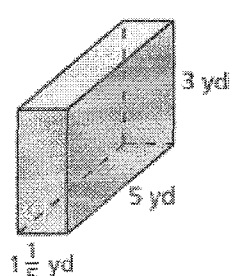
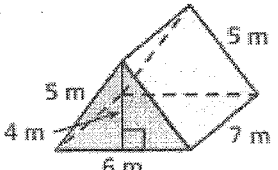
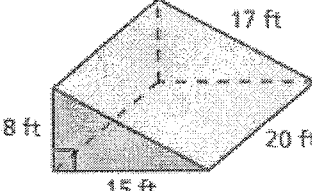
DATE: \_\_\_\_\_

SURFACE AREA & VOLUME

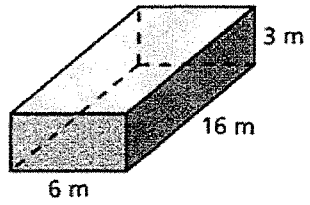
PERIOD: \_\_\_\_\_

### **HOMEWORK - (Topic #1)**

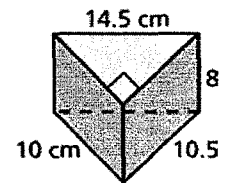
#### **Finding Surface Area of a Prism**

<b>Problem</b>	<b>Work</b>
<p>1.</p>  <p>A 3D diagram of a rectangular prism. The front face is a rectangle with a width of <math>1\frac{1}{5}</math> yd and a height of 3 yd. The depth of the prism is 5 yd. Dashed lines indicate the hidden edges.</p>	
<p>2.</p>  <p>A 3D diagram of a triangular prism. The base is a right-angled triangle with a base of 6 m and a height of 4 m. The two slanted sides of the triangle are both 5 m. The length of the prism is 7 m. Dashed lines indicate the hidden edges.</p>	
<p>3.</p>  <p>A 3D diagram of a trapezoidal prism. The base is a trapezoid with a top width of 15 ft, a bottom width of 8 ft, and a height of 17 ft. The length of the prism is 20 ft. Dashed lines indicate the hidden edges.</p>	

4.



5. You buy a ring box as a birthday gift that is in the shape of a triangular prism. What is the least amount of wrapping paper needed to wrap the box?



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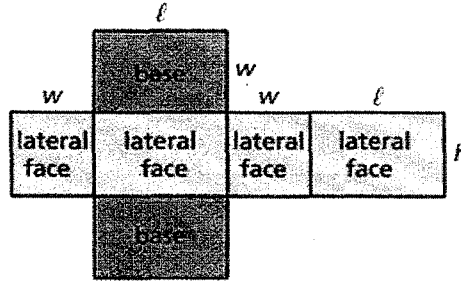
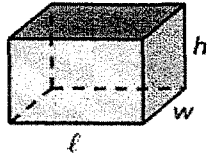
SURFACE AREA &amp; VOLUME

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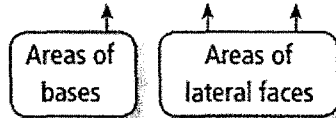
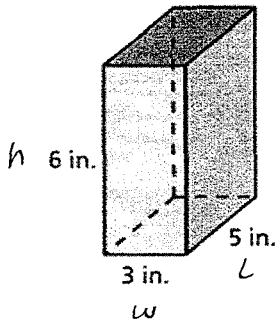
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**How Do You Find Surface Area of a Prism?****(Topic #1)**

The surface area of a rectangular box is the sum of the areas of its six rectangular sides.



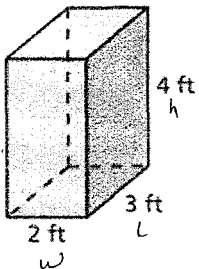
**Algebra**  $S = 2lw + 2lh + 2wh$

**EXAMPLE 1: Finding the Surface Area of a Rectangular Prism**

$$\begin{aligned}
 SA &= 2lw + 2lh + 2wh \\
 &= 2(5)(3) + 2(5)(6) + 2(3)(6) \\
 &= 30 + 60 + 36 \\
 &= 126 \text{ in}^2
 \end{aligned}$$

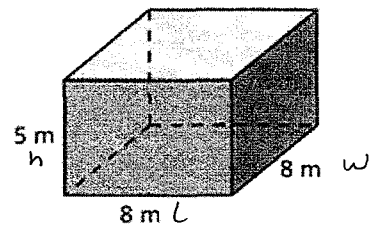
**PRACTICE: Find the surface area of the prism.**

1.



$$\begin{aligned}
 SA &= 2lw + 2lh + 2wh \\
 &= 2(3)(2) + 2(3)(4) + 2(2)(4) \\
 &= 12 + 24 + 16 \\
 &= 52 \text{ ft}^2
 \end{aligned}$$

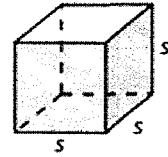
2.



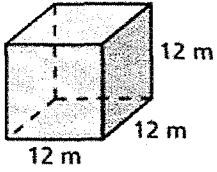
$$\begin{aligned}
 SA &= 2lw + 2lh + 2wh \\
 &= 2(8)(8) + 2(8)(5) + 2(8)(5) \\
 &= 128 + 80 + 80 \\
 &= 288 \text{ m}^2
 \end{aligned}$$

When all the edges of a rectangular prism have the same length  $s$ , the rectangular prism is a cube.

$$\text{Surface Area of a Cube} = 6s^2$$

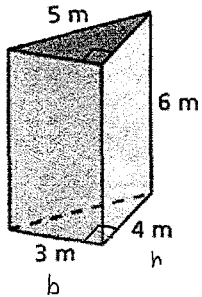


**EXAMPLE 2: Finding the Surface Area of a Cube**



$$\begin{aligned} SA &= 6e^2 \\ &= 6(12)^2 \\ &= 864 \text{ m}^2 \end{aligned}$$

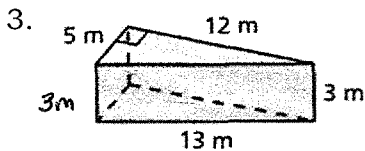
**EXAMPLE 3: Finding the Surface Area of a Triangular Prism**



$\begin{aligned} \Delta \\ A &= (\cancel{2}) \frac{1}{2} bh \\ &= 2 \left( \frac{1}{2} \right) (3)(4) \\ &= 12 \end{aligned}$	$\begin{aligned} A &= lw \\ &= (3)(6) \\ &= 18 \end{aligned}$	$\begin{aligned} A &= lw \\ &= 6(4) \\ &= 24 \end{aligned}$	$\begin{aligned} A &= lw \\ &= 5(6) \\ &= 30 \end{aligned}$
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$$\begin{aligned} SA &= 12 + 18 + 24 + 30 \\ &= 84 \text{ m}^2 \end{aligned}$$

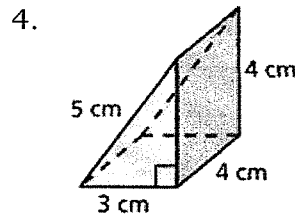
**PRACTICE: Find the surface area of the prism.**



$$\begin{aligned} A &= lw \\ &= 5(3) \\ &= 15 \end{aligned}$$

$\begin{aligned} \Delta \\ A &= (\cancel{2}) \frac{1}{2} bh \\ &= 5(12) \\ &= 60 \end{aligned}$	$\begin{aligned} A &= lw \\ &= 13(3) \\ &= 39 \end{aligned}$	$\begin{aligned} A &= lw \\ &= 12(3) \\ &= 36 \end{aligned}$
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$$\begin{aligned} SA &= 60 + 39 + 36 + 15 \\ &= 150 \text{ m}^2 \end{aligned}$$

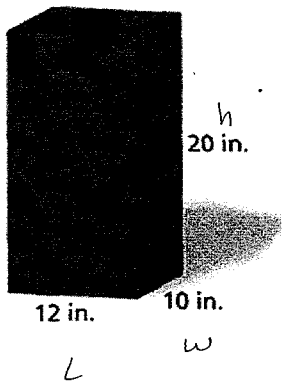


$$\begin{aligned} A &= lw \\ &= 5(4) \\ &= 20 \end{aligned}$$

$\begin{aligned} \Delta \\ A &= (\cancel{2}) \frac{1}{2} bh \\ &= 3(4) \\ &= 12 \end{aligned}$	$\begin{aligned} A &= lw \\ &= 4(3) \\ &= 12 \end{aligned}$	$\begin{aligned} A &= s^2 \\ &= 4^2 \\ &= 16 \end{aligned}$
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$$\begin{aligned} SA &= 12 + 12 + 16 + 20 \\ &= 60 \text{ cm}^2 \end{aligned}$$

**EXAMPLE 4: Real-Life Application**



The outsides of purple traps are coated with glue to catch emerald ash borers. You make your own trap in the shape of a rectangular prism with an open top and bottom. What is the surface area that you need to coat with glue?

$$A = lw(2)$$
$$A = (2)(12)(20)$$
$$A = 480$$

$$A = lw(2)$$
$$A = 2(20)(10)$$
$$A = 400$$

$$SA = 480 + 400$$
$$= 880 \text{ in}^2$$



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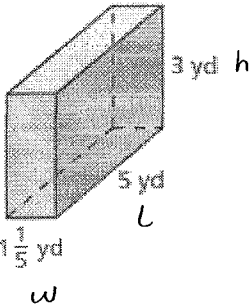
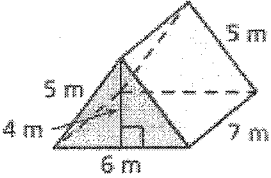
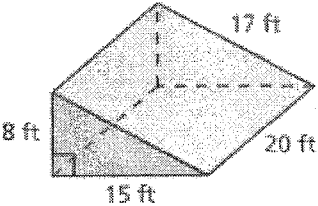
SURFACE AREA &amp; VOLUME

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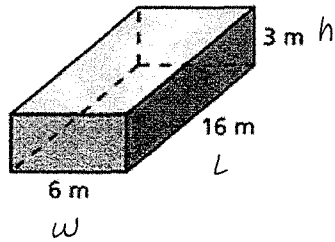
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**HOMEWORK - (Topic #1)****Finding Surface Area of a Prism**

Problem	Work									
<p>1.</p> 	$SA = 2LW + 2Lh + 2wh$ $SA = 2(5)(1\frac{1}{5}) + 2(5)(3) + 2(1\frac{1}{5})(3)$ $SA = 12 + 30 + 7.2$ $SA = 49.2 \text{ yd}^2$									
<p>2.</p> 	$\frac{\Delta}{A = 2(\frac{1}{2})bh}$ $A = 2(\frac{1}{2})(6)(4)$ $A = 24$ <table style="border-collapse: collapse; margin-left: 20px;"> <tr> <td style="border-right: 1px solid black; padding: 5px;"><math>A = lw</math></td> <td style="border-right: 1px solid black; padding: 5px;"><math>A = lw</math></td> <td style="padding: 5px;"><math>A = lw</math></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 5(7)</math></td> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 7(6)</math></td> <td style="padding: 5px;"><math>A = 7(5)</math></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 35</math></td> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 42</math></td> <td style="padding: 5px;"><math>A = 35</math></td> </tr> </table> $SA = 24 + 35 + 42 + 35$ $SA = 136 \text{ m}^2$	$A = lw$	$A = lw$	$A = lw$	$A = 5(7)$	$A = 7(6)$	$A = 7(5)$	$A = 35$	$A = 42$	$A = 35$
$A = lw$	$A = lw$	$A = lw$								
$A = 5(7)$	$A = 7(6)$	$A = 7(5)$								
$A = 35$	$A = 42$	$A = 35$								
<p>3.</p> 	$\frac{\text{Triangle}}{A = (\frac{1}{2})bh}$ $= (8)(15)$ $= 120$ <table style="border-collapse: collapse; margin-left: 20px;"> <tr> <td style="border-right: 1px solid black; padding: 5px;"><math>A = lw</math></td> <td style="border-right: 1px solid black; padding: 5px;"><math>A = lw</math></td> <td style="padding: 5px;"><math>A = lw</math></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 20(8)</math></td> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 20(17)</math></td> <td style="padding: 5px;"><math>A = 15(20)</math></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 160</math></td> <td style="border-right: 1px solid black; padding: 5px;"><math>A = 340</math></td> <td style="padding: 5px;"><math>A = 300</math></td> </tr> </table> $SA = 120 + 160 + 340 + 300$ $= 920 \text{ ft}^2$	$A = lw$	$A = lw$	$A = lw$	$A = 20(8)$	$A = 20(17)$	$A = 15(20)$	$A = 160$	$A = 340$	$A = 300$
$A = lw$	$A = lw$	$A = lw$								
$A = 20(8)$	$A = 20(17)$	$A = 15(20)$								
$A = 160$	$A = 340$	$A = 300$								

4.



$$\begin{aligned}
 SA &= 2Lw + 2Lh + 2wh \\
 &= 2(16)(6) + 2(16)(3) + 2(6)(3) \\
 &= 192 + 96 + 36 \\
 &= 324 \text{ m}^2
 \end{aligned}$$

5. You buy a ring box as a birthday gift that is in the shape of a triangular prism. What is the least amount of wrapping paper needed to wrap the box?

$\Delta$

$$A = \frac{1}{2}bh(2)$$

$$A = \frac{1}{2}(10)(10.5)(2)$$

$$A = 105$$

$$A = Lw$$

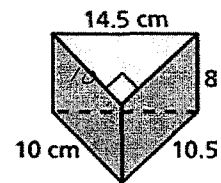
$$A = 10.5(8)$$

$$A = 84$$

$$A = Lw \quad A = lw$$

$$A = (10)(8) \quad A = (14.5)(8)$$

$$A = 80 \quad A = 116$$



$$SA = 105 + 84 + 80 + 116$$

$$SA = 385 \text{ cm}^2$$