

# 4 Surface Area

September 11, 2018 9:22 PM

total sum ⊕ of the surface area: areas of the sides (3D-shapes)

FMPC10

Updated June 2018

Geometry of 3-D figures.

Net: flatted shape (unfolding)

Familiarize yourself with the shapes, names and formulas at the beginning of this booklet.

Using the reference page at the beginning of this unit.

- Choose the right formula.
- Fill in all known values into the formula.
- Calculate (remember BEDMAS).

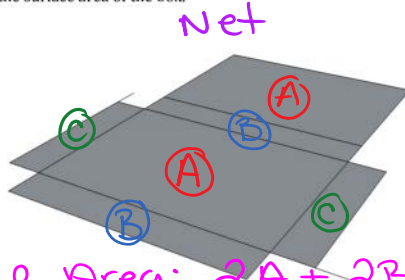
① manipulate formula to solve for a given variable  
② substitute all known variables

## Surface Area

Area is the two-dimensional size of a surface. Consider the area that this booklet is covering on the surface below it (unless you are on a computer of course).

The surface area of a solid is the total area of its exposed surfaces.

Consider a common cereal box. If you unfolded the sides, top, bottom, front and back...how much area on your desk would it cover? That would be the surface area of the box.



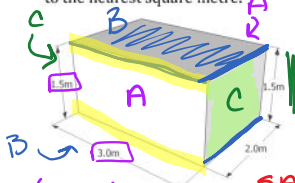
Total Area:  $2A + 2B + 2C$

Units = squared  
eg.  $\text{in}^2, \text{cm}^2, \text{m}^2, \dots$

Unit Test Thursday  
(This Book only)

127. Refer to page 5 to answer the following question.

Find the surface area of the rectangular prism below to the nearest square metre.

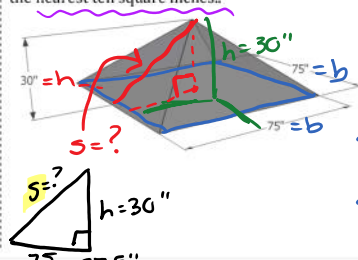


$A = 2(1.5 \times 3) = 9 \text{ m}^2$   
 $B = 2(2.0 \times 3) = 12 \text{ m}^2$   
 $C = 2(2.0 \times 1.5) = 6 \text{ m}^2$   
 $SA = A + B + C = 9 + 12 + 6 = 27 \text{ m}^2$

Page 29 Measurement

128. Refer to page 5 to answer the following question.

Find the surface area of the square pyramid below to the nearest ten square inches.



$s = ?$   
 $h = 30''$   
 $\frac{75}{2} = 37.5''$   
 $a^2 + b^2 = c^2$   
 $c = \sqrt{a^2 + b^2}$   
 $c = \sqrt{(30)^2 + (37.5)^2}$

$SA = 2bs + b^2$

$SA = 2(75)(48.02) + (75)^2$

$SA = 7203 + 5625$

$SA = 12828 \text{ in}^2$

round to "tens"

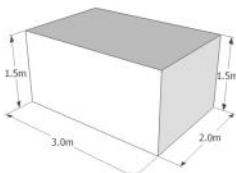
$SA = 12830 \text{ in}^2$

$C = s = 48.02''$

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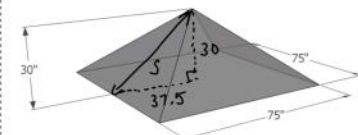
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Find the surface area of the rectangular prism below to the nearest square metre.



$SA = 2(hl + lw + hw)$   
 $SA = 2[(1.5 \times 3) + (3 \times 2) + (1.5 \times 2)]$   
 $SA = 2[4.5 + 6 + 3]$   
 $SA = 27 \text{ m}^2$

Find the surface area of the square pyramid below to the nearest ten square inches.



$A = 2bs + b^2$   
 $A = 2(75)(s) + (75)^2$

Need 's'  
Use  $a^2 + b^2 = c^2$   
 $37.5^2 + 30^2 = s^2$   
 $s = 48.0$

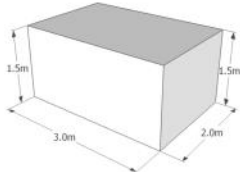
$A = 2(75)(48.0) + (75)^2$   
 $A \approx 12830 \text{ sq in}$

$$C = s = 48.02''$$

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Find the surface area of the rectangular prism below to the nearest square metre.



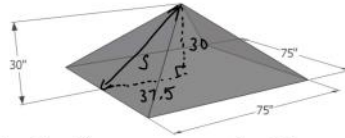
$$SA = 2(lh + lw + hw)$$

$$SA = 2[(1.5 \times 3) + (3 \times 2) + (1.5 \times 2)]$$

$$SA = 2[4.5 + 6 + 3]$$

$$SA = 27 \text{ m}^2$$

Find the surface area of the square pyramid below to the nearest ten square inches.



$$A = 2bs + b^2$$

$$A = 2(75)(s) + (75)^2$$

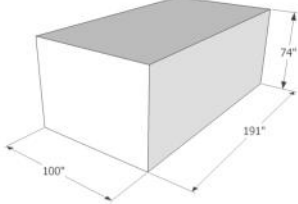
Need 's'  
Use  $a^2 + b^2 = c^2$   
 $37.5^2 + 30^2 = s^2$   
 $s = 48.0$

$$A = 2(75)(48.0) + (75)^2$$

$$A \approx 12830 \text{ sq in}$$

Calculate the surface area of the following figures. Answers should be given as indicated.

129. Nearest square inch.



130. Nearest square inch.

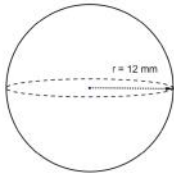


$$A = \pi r^2 + \pi r s$$

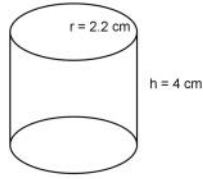
$$= \pi (46.5^2) + \pi (46.5)(s)$$

Calculate the surface area of the following figures. Answers should be given as indicated.

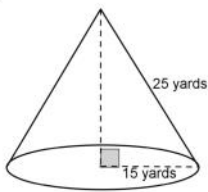
131. Nearest square millimetre.



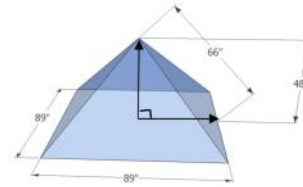
132. Nearest square centimetre.



133. Nearest square foot.



134. Nearest square foot.

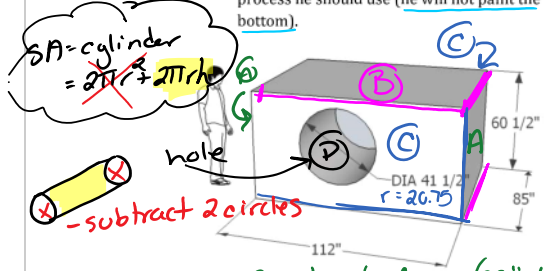


135. Calculate the surface area of a cone with a height of 10 cm and a base diameter of 12 cm. Answer to the nearest square centimetre.

136. A cone has a base radius of 15 inches and a surface area of 1650 square inches. Find the slant height of the cone to the nearest inch.

$A_{circle} = \pi r^2$

137. Frank needs to find the surface area of the playground equipment below so he can estimate how much paint to buy. Explain the process he should use (he will not paint the bottom).



Explain.  $2 \times \text{ends 'A'} = l \times w = (85 \times 60.5) \times 2$   
 $1 \text{ Top 'B'} = l \times w = 112 \times 85$   
 $2 \times \text{Front + Back 'C'} = (l \times w) - \pi r^2 = (112 \times 60.5) - (\pi (20.75)^2) \times 2$   
 $\text{Tunnel 'D'} = 2\pi r h = 2\pi (20.75)(85)$

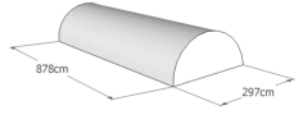
138. Find the surface area of the figure to the left to the nearest square inch.

$2 \times A = 10\,285 \text{ in}^2$  ✓  
 $1 \times B = 9\,820 \text{ in}^2$   
 $2 \times C = 10\,846.7 \text{ in}^2$  ←  
 $D = 11\,081.96 \text{ in}^2$  ←  
**Total SA = 41\,734 in<sup>2</sup>**

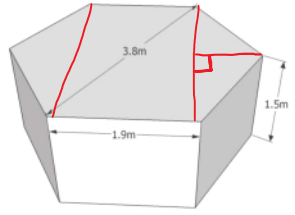
139. One quart of paint (a small can) covers 87.5 sq ft. How many quarts will Frank need to buy?

$\frac{41\,734 \text{ in}^2}{144 \text{ in}^2} = 289.82 \text{ ft}^2$   
 $\frac{289.82 \text{ ft}^2}{87.5 \text{ ft}^2 \text{ (can)}} = 3.3 \approx 4 \text{ quarts of paint.}$

140. Find the surface area of the concrete curb below (all surfaces). Answer to the nearest square centimetre.



141. Calculate the surface area of the hexagonal prism (regular) to the nearest square metre.



HW Q#129-141 (surface area)