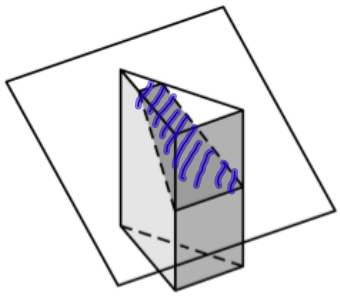
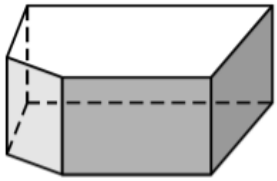
Bellwork:

1. Determine whether the statement *A cylinder is a convex polyhedron* is true or false. Explain your reasoning.

2. Describe the cross section.



3. Find the number of faces, edges, and vertices of the polyhedron and use them to verify Euler's Theorem.

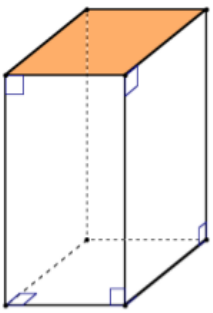


4. A solid has 14 faces: 6 octagons and 8 triangles. How many vertices does it have?

12.2 Surface Area of Prisms and Cylinders

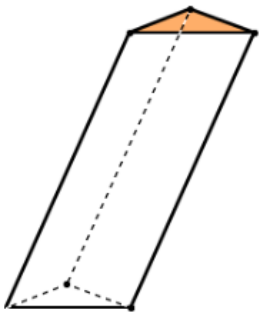
Prisms are polyhedra
- look for two congruent ($\cong$) faces - those will be the bases
- all the other faces are parallelograms called lateral faces
- the lateral faces connect the bases

Right Prism
(lateral faces are rectangles)



right rectangular prism

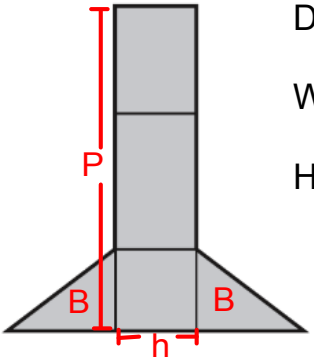
Oblique Prism
(lateral faces are non-rectangle parallelograms)



oblique triangular prism

Surface area of a polyhedron: sum of the areas of all of the faces

the net of a solid
2D representation of a 3D figure
fold it up to create the 3D shape
use it to find surface area



Do you see which two are the bases?
Which shape is not a rectangle (look at the ones sticking out)

What type of solid would it make?
Triangular Prism (two bases means prism | one base means pyramid)

How would we find the surface area?
two ways:
1. find the area of each shape separately and add them
2. see the lateral rectangles as one big rectangle and use the surface area formula

Formula for Surface area of a Right Prism:

$$SA = 2B + Ph$$

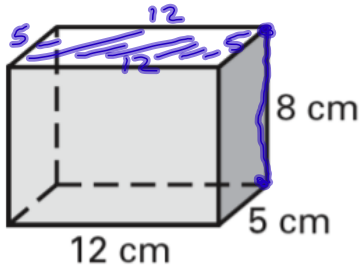
LA

B: area of the base
P: perimeter of the base
h: height of the prism (distance separating the two bases)

SA = 2B + Ph

Ex 1:

B = 5.12 = 60
P = 34 h = 8



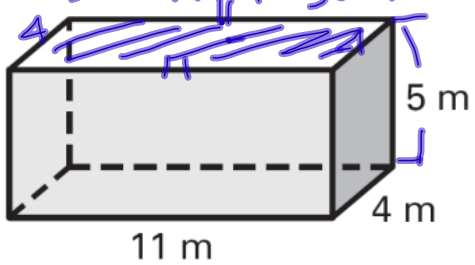
SA = 2B + Ph
= 2(60) + 34(8)
= 120 + 272
= 392 cm²

chunks
top = 5.12 = 60
bottom 60
front = 12.8 = 96
back 96
left = 8.5 = 40
right 40
392

Ex 2: on your own

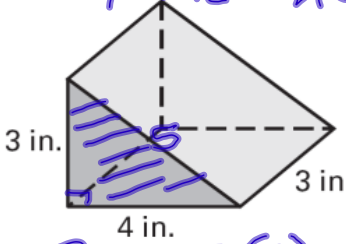
SA = 2B + Ph
= 2(44) + 30(5)
88 + 150 = 238 m²

B = 44 P = 30 h = 5



Ex 3: be careful when identifying the bases and the height!

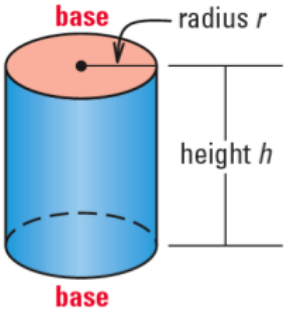
B = 6 ($\frac{1}{2}$ · 4 · 3)
P = 12 h = 3



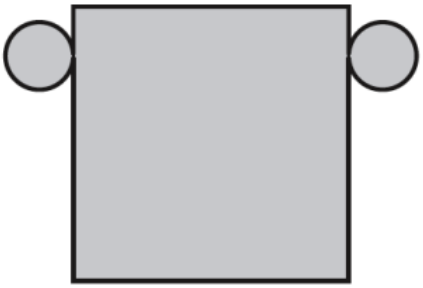
SA = 2(6) + 12(3)
= 12 + 36 = 48 in²

Cylinder - a solid with congruent circle bases

right cylinder
segment connecting centers of circle bases is ⊥ to bases



net of a right cylinder



Surface area of a Right Cylinder:

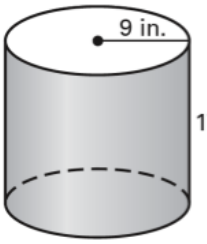
$S = 2B + Ch$

OR

$S = 2\pi r^2 + 2\pi rh$

B: area of the base
C: circumference of the base
h: height of the cylinder (distance separating the two bases)

Ex 3: Find surface area



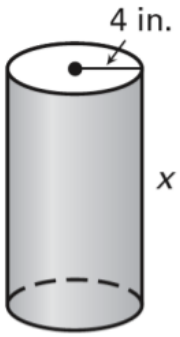
$C = 2\pi(9) = 18\pi$

$B = \pi(9^2) = 81\pi$

$SA = 2B + Ch$
$= 2(81\pi) + 18\pi(17)$
$= 162\pi + 306\pi$
$= 468\pi \text{ in}^2$

Ex 4: use formula to solve for x

$S = 452.4 \text{ in.}^2$



Summary:

prisms and cylinders:
both have two congruent bases
both have rectangular lateral area
formulas can be generalized:

$$S = 2B + L$$

S = surface area
B = area of base
L = lateral area (area of all lateral faces)