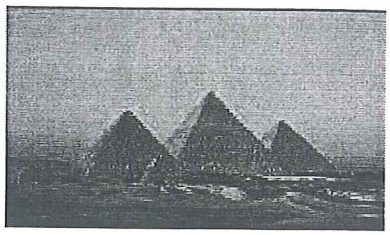
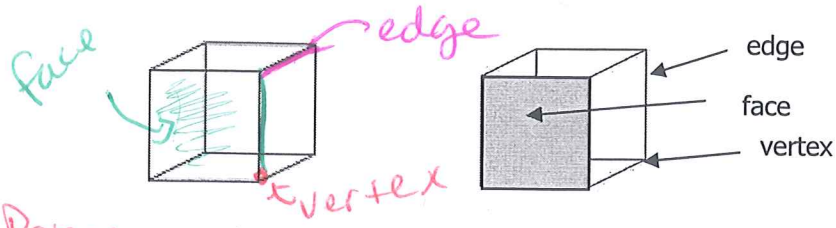
Geometry Notes 12/2-12/3 Name: _____

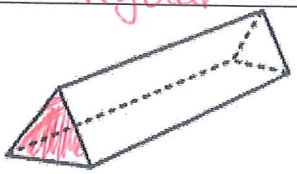
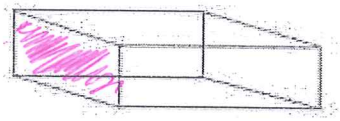
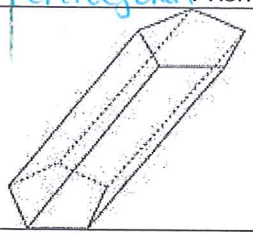


This is a photo of the pyramid of Menkaure in Giza, Egypt. It is an example of a ***polyhedron***.

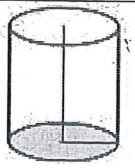
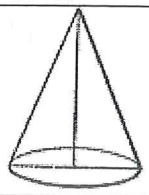
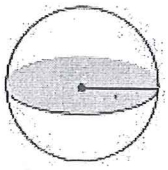
A solid with all flat surfaces that enclose a single region of space is called a polyhedron. Each flat surface, called a faces, is a polygon. The line segments where the faces intersect are called edges. edges intersect at a point called a vertex.



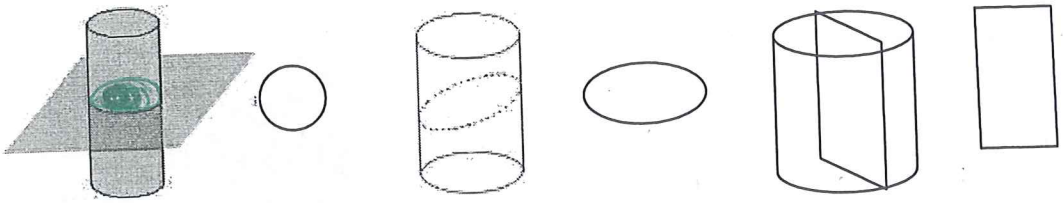
A Prism is a polyhedron with two parallel congruent faces called bases. The other faces are **parallelograms**. Name each prism by its **bases**. A regular prism has bases that are regular polygons.

Name	Triangular Prism	Rectangular Prism	Pentagonal Prism
Model			
Shape of bases	Triangle	Rectangle	Pentagon

A polyhedron with all faces (except for one) intersecting at one vertex is a pyramid which are named for their bases, which can be any polygon.

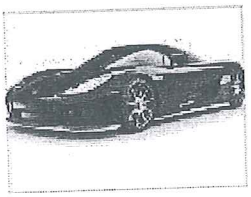
NOT Polyhedrons			
Name	Cylinder	Cone	Sphere
Model			
Description	≅ circular bases in a pair of parallel planes	circular base and vertex	set of points in space that are a given distance from a given point

A Cross Section is a "slice" of a solid.

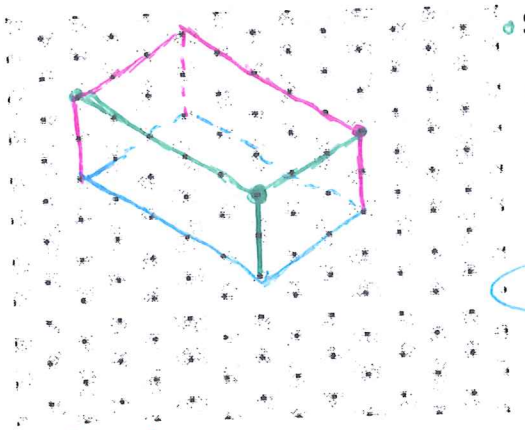


Cross section: Circle Slice: Oval Slice: Rectangle

Surface area is important to car manufacturers because modifying surface area can help the aerodynamics of a car. Modifying surface area can increase speed and efficiency.

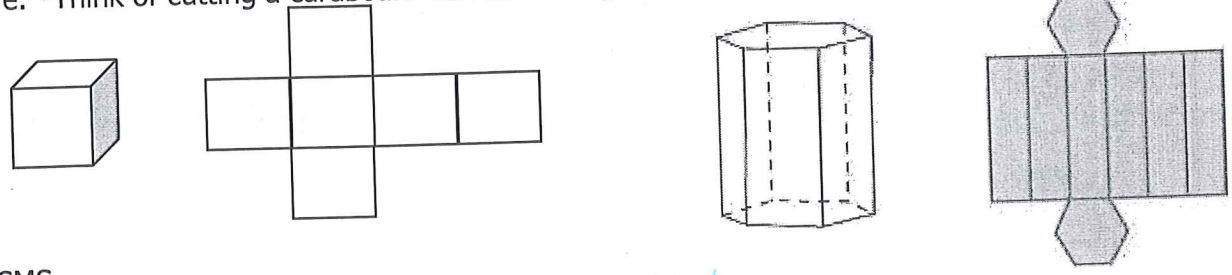


Steps for drawing a rectangular prism 2 units high, 5 units long, and 3 units wide.



- Step 1: Draw the corner. 2 units down, 5 units to left, 3 to right
- Step 2: Draw a parallelogram for the top of the solid
- Step 3: Draw segments 2 units down from each vertex for edges
- Step 4: Connect the corresponding vertices. Use dashed lines for hidden edges. Shade the top of the solid.

A Net is a pattern for a three-dimensional solid. Nets can be made for any solid figure. *Think of cutting a cardboard box at the edges and laying it flat.



PRISMS

- The bases are Congruent faces in Parallel planes.
- The faces that are not bases are called Lateral faces.
- The lateral faces intersect at the lateral edges.
- Lateral edges are Parallel segments.
- A segment perpendicular to the bases with an endpoint in each plane is called an altitude of the prism. Height = Altitude.
- A prism with lateral edges that are also altitudes is called a right prism.
- If lateral edges are not perpendicular to the bases, it is an oblique prism.
- Lateral area, L, is the sum of the areas of the lateral faces.

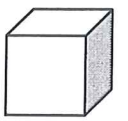
$A = \frac{1}{2} P \cdot a$

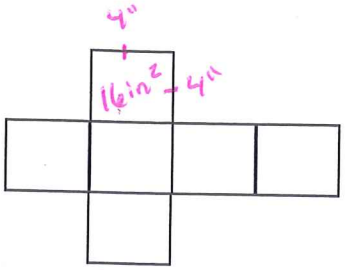
One way to find the **Surface Area** (T) of a solid is to draw the net, find the area of each 2-dimensional surface, and then add the areas together. Find the surface area of the cube and the right regular hexagonal prism.

$\frac{1}{2} \cdot 5\sqrt{3} \cdot 60 = 259.8 m^2$

$\times 2$

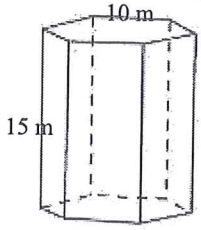
$519.6 m^2$





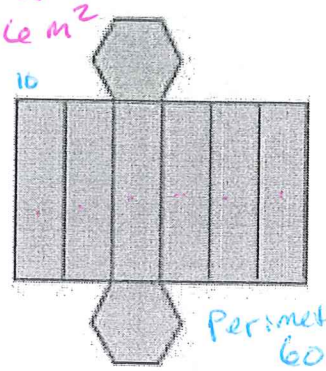
$16 "in^2 \times 6$

96^{u^2}



150

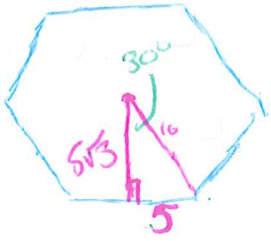
$\times$ 4



What is the **Lateral Area** (L) of the hexagonal prism? $900 m^2$

$900 m^2 + 519.6 m^2$

$1,419.6 m^2$



1 : $\sqrt{3}$: 2

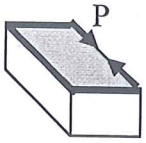
5 $5\sqrt{3}$ 10

LATERAL AREA OF A PRISM (using a Formula)

Another way to find the Lateral or Surface area of a right prism is to use a formula.

If a right prism has a lateral area of L square units, a height of h units, and each base has a perimeter of P units, then $L = P \cdot h$

Lateral Surface Area — Perimeter — Height



$L = 60 \cdot 15$

P h

$L = 900 m^2$

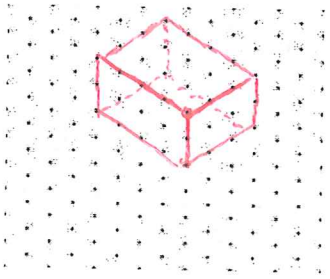
SURFACE AREA OF A PRISM (using a Formula)

If the surface area of a right prism is T square units, its height h units, and each base has an area of B square units, and a perimeter of P units, then $T = L + 2B$

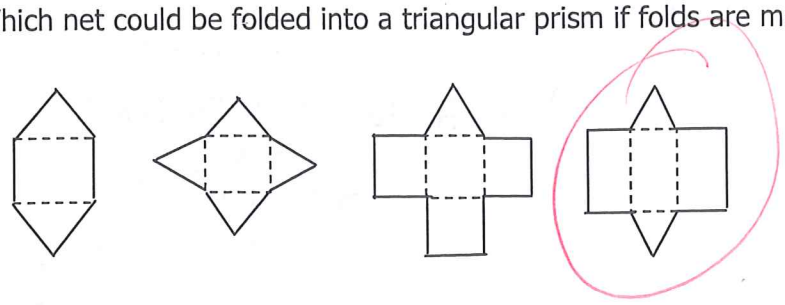
Surface Area — Lateral Surface Area — Area of the Base

Example Problems

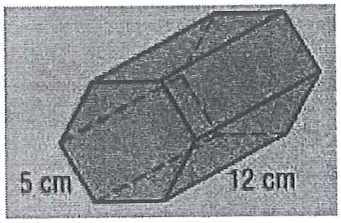
1. Sketch a rectangular prism 4 units long, 3 units wide, and 2 units high using the given isometric dot paper.



2. Which net could be folded into a triangular prism if folds are made only along dotted lines?



3. Find the lateral area of the regular hexagonal prism. (Use a formula.)

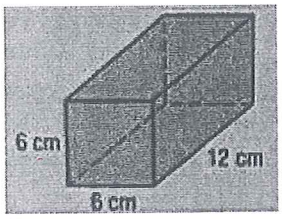


$L = P \cdot h$

$L = 30\text{cm} \cdot 12\text{cm}$

$L = 360\ \text{cm}^2$

4. Find the surface area of the square prism. (Use a formula.)



$L = 24\text{cm} \cdot 12\text{cm}$

Perimeter of Base · height

$L = 288\ \text{cm}^2$

$T = L + 2(B)$

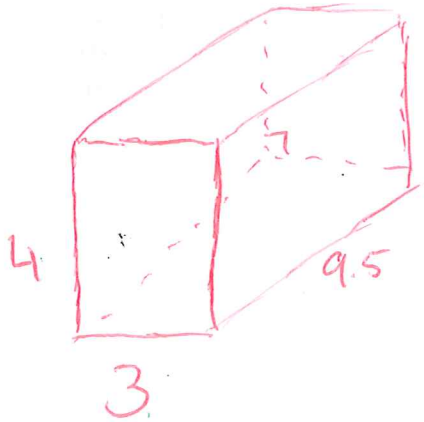
Surface area = Area of Base

$T = 288\text{cm}^2 + 2 \cdot 36$

$T = 288\text{cm}^2 + 72\text{cm}^2$

$T = 360\ \text{cm}^2$

5. A solid block of marble will be used for a sculpture. If the block is 3 feet wide, 4 feet long, and 9.5 feet high, find the surface area of the block. (Use a formula.)



$P = 14\text{ ft}$

$L = 14\text{ft} \cdot 9.5$

$L = 133\text{ft}$

$T = L + 2(B)$

$T = 133\text{ft} + 2(3 \cdot 4)$

$= 133\text{ft}^2 + 2(12)$

$133\text{ft}^2 + 24$

$= 157\text{ft}^2$