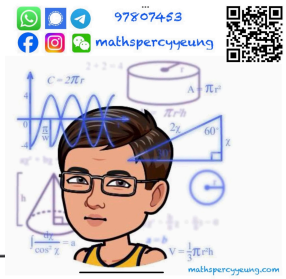
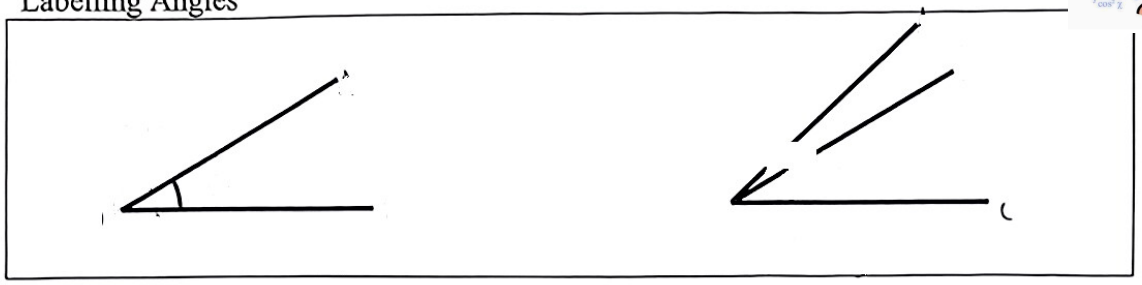


6.1 Basic Geometric Concepts

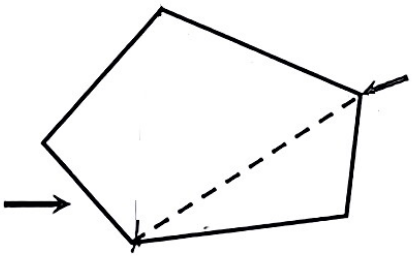
Labelling Angles



Types of Angles

Angle	Angle	Angle	Angle	Angle
$0^\circ < \text{angle} < 90^\circ$	$\text{angle} = 90^\circ$	$90^\circ < \text{angle} < 180^\circ$	$\text{angle} = 180^\circ$	$180^\circ < \text{angle} < 360$

Polygons



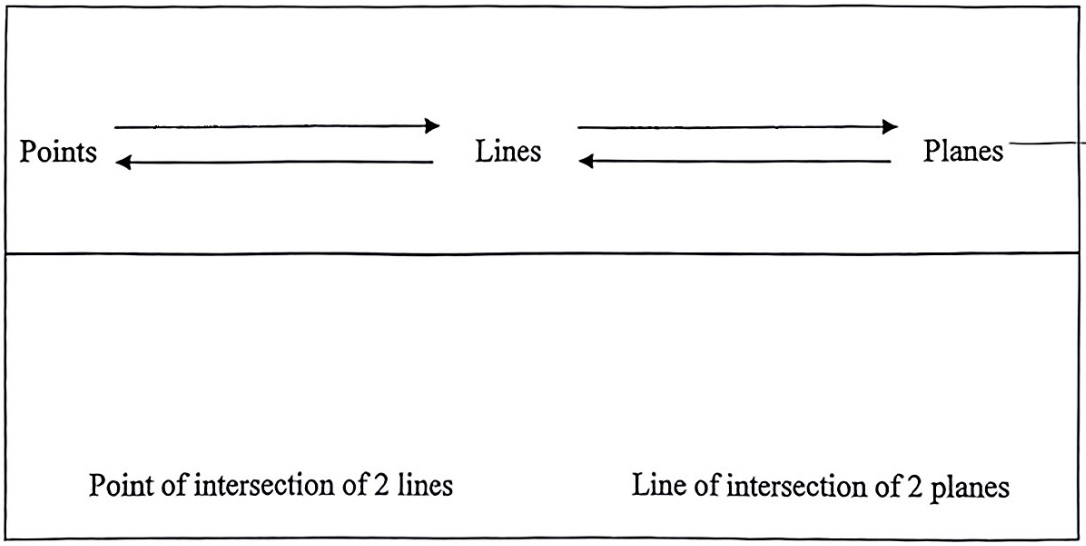
The Name of an n-sided Polygon

n	Name	
3		
4		
5		
6		
7		
8		
9		
10		

A. Points, Lines and Surfaces

Point	*Line*	
	Straight line	*Curve*
- represent a _____ in space - no _____	- made up of an _____ number of points - has a _____ but no _____ - can be _____ in both directions without end	

Line Segment	*Surface*	
	Plane	*Curved surface*
- part of a straight line - named by two end points e.g. AB in the figure	- flat - no _____ - contains an _____ number of lines	- not flat



Will 2 lines always intersect? What about 2 planes?

_____

_____

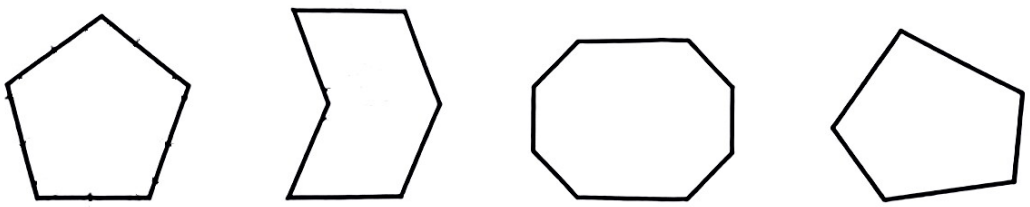
B. Planes Figures (2D-Figures) (e.g._____)

I. Polygons

How would you classify the following polygons?

_____

_____



Types of Polygons

_____ Polygons	Equal _____	
_____ Polygons	Equal _____	
_____ Polygons	Equal _____ and equal _____	

	Convex polygon	Concave polygon
Nature		
Example		

Exploration on Triangles

1. Prepare a triangle with no equal sides. Label the three vertices as A, B and C.

(a) Measure its sides and angles.

AB	BC	CA	$\angle A$	$\angle B$	$\angle C$

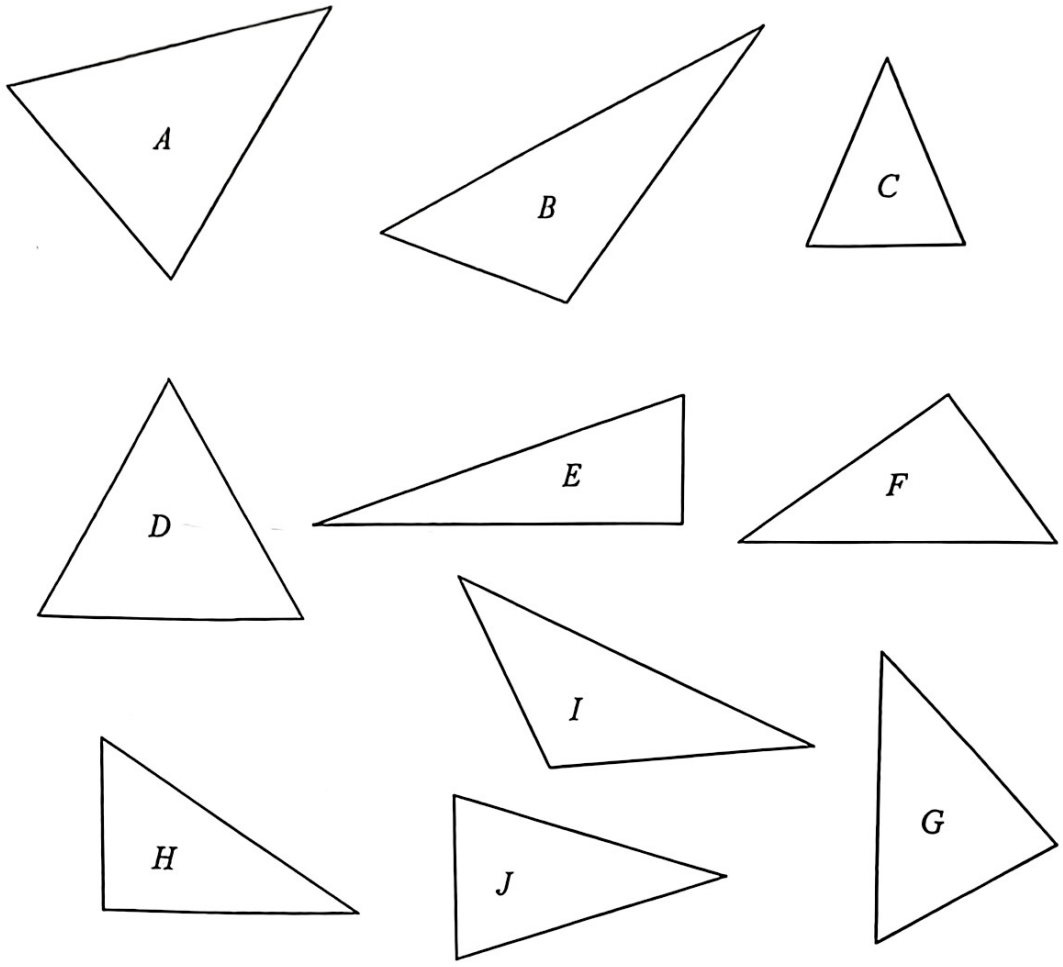
(b) According to its **sides**, ΔABC is a/an _____ triangle.

According to its **angles**, ΔABC is a/an _____ triangle.

(c) Longest side = _____, largest angle = _____ .

(d) Shortest side = _____, smallest angle = _____ .

(e) What can you say about the relationship between the sides and angles of a triangle?



Can you classify the above triangles into different types? How many ways of classification can you think of?

Classification of Triangles (according to the _____)

Name	Triangle	Triangle	Triangle
Property			
Example			

Classification of Triangles (according to the _____)

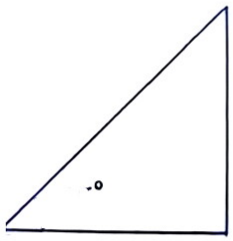
Name	-angled Triangle	-angled Triangle	-angled Triangle
Property	All _____ are _____	One _____ is a _____	One _____ is an _____
Example			

Is it possible to have the following combinations of triangles?

Types of Triangles	Acute-angled	Right-angled	Obtuse-angled
Scalene			
Isosceles			
Equilateral			

Can you construct the following triangles?

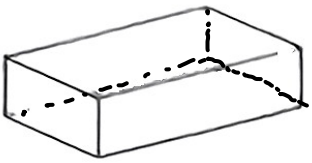
(a) $PQ = 3$ cm, $QR = 4$ cm, $\angle PQR = 45°$.



(b) $AB = 2$ cm, $BC = 3$ cm, $CA = 4$ cm.

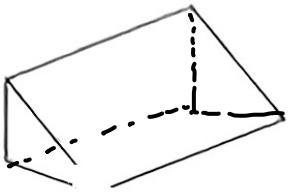
6.2 Solid Figures (3-D Figures)

A



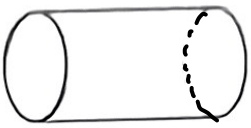
_____

B



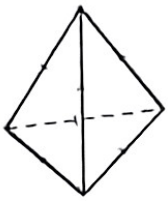
_____

C



_____

D

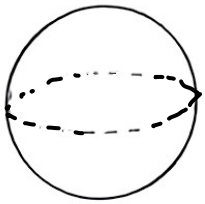


_____

E

_____

F



_____

Polyhedra : _____

Non-polyhedra : _____

Right Prisms / Right Cylinders:

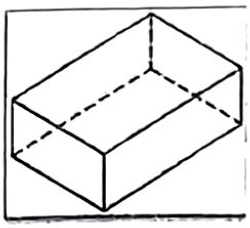
Naming of a polyhedron

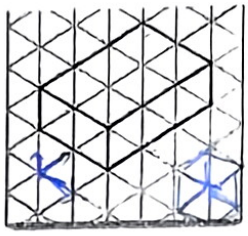
Name of Polyhedron	Number of _____
Tetrahedron	
Pentahedron	
Hexahedron	
Heptahedron	
⋮	⋮

2-D Representations of Simple Solids

Sketch the 2-D representation of the prism below.

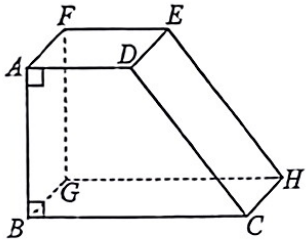
Sketch the 2-D representation of the cylinder on the right.

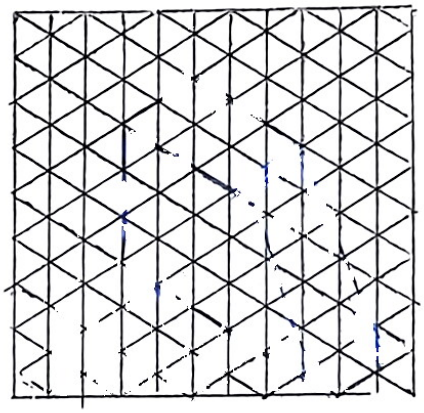




2-D representation on isometric grid paper.

Sketch the 2-D representation of the prism on the left on the given isometric grid paper.





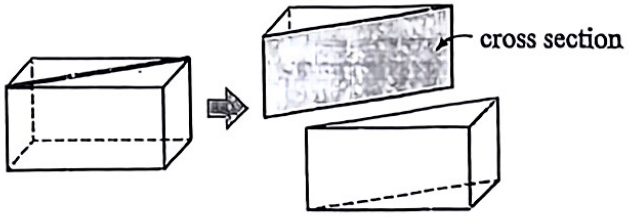
Points to note when drawing 3-D figures on isometric papers:

(1) Mark the axes of the 3 directions.

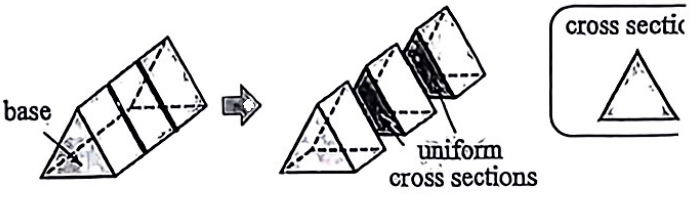
(2) The _____ , _____ and _____ are preserved in the isometric drawing.

Cross Section

(a) When a solid is cut, the new flat surfaces formed are called the **cross sections** of the solid.



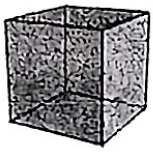
(b) Suppose a solid is cut into pieces in a direction parallel to one of its faces. If the cross sections obtained are identical in shape and size, then they are called **uniform cross sections.**



A **platonic solid** is a solid figure (or three-dimensional figure) where

- each face is the same regular polygon, and
- the same number of polygons meet at each vertex.

There are only five such solids. Do you know any of them? Complete the table below. (The nets of two platonic solids are attached in the next two pages.)

Platonic solids	**Tetrahedron**	**Cube**			
2D-representation					
Each face is a/an …					
Number of **faces** (F)					
Number of **vertices** (V)					
Number of **edges** (E)					

Can you see any relation among the values of F, V and E in each column?

_____

Euler's formula: _____)

Chapter 6: Basic Geometry
Revision Exercise

1. Fill in the blanks.

   (a) A/An _____ has no size. It represents a position in space and is represented by a dot.

   (b) An angle is said to be _____ when its measure is equal to 90°.

   (c) The point where two lines form an angle is called the _____.

   (d) A _____ polygon is both equilateral and equiangular.

   (e) An object that occupies space is called a _____ or a 3-D figure.

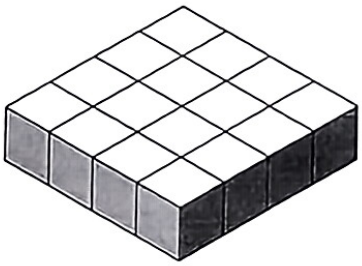
   (f) A polygon having four sides is called a _____.

   (g) Two lines are said to be perpendicular if they meet each other at a _____ angle.

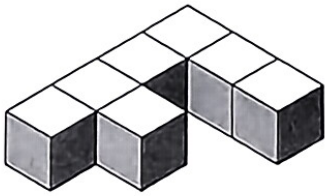
   (h) When a solid is cut along a certain plane, the face so obtained is called a _____ of the solid.

   (i) The line segment formed when two faces of a solid meet is called _____ of the solid.

2. Draw the remaining part after removing solid B from solid A using the isometric grid paper below.



Solid A



Solid B