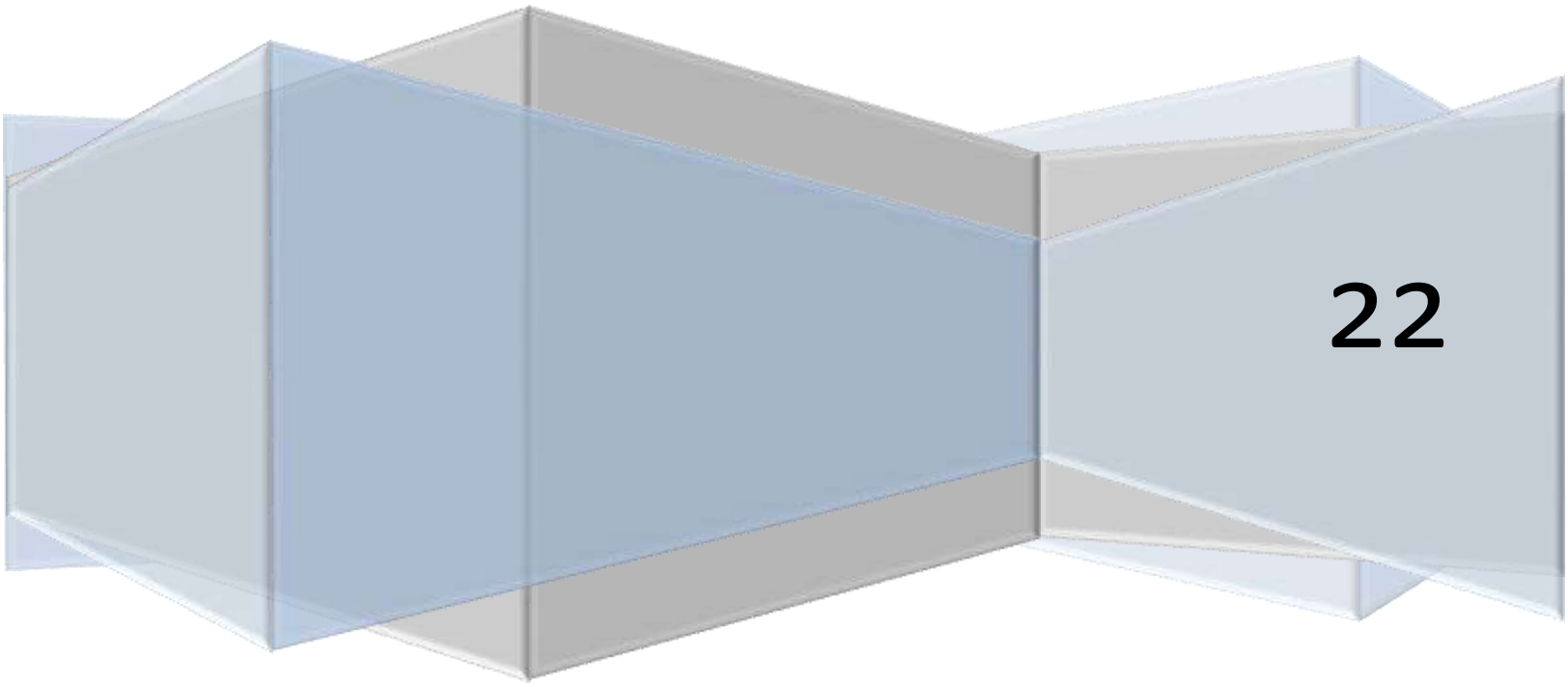
Class 5

Mathematics Prerequisite



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Mathematics

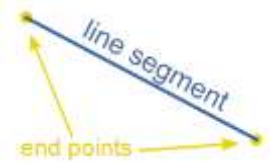
KNOWLEDGE

Line

A line is straight (no curves), has no thickness,
and extends in both directions without end (infinitely).

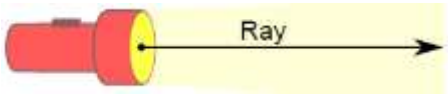
A line has **no ends** !

Line Segment



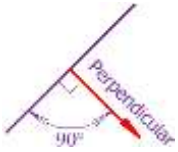
When it **does** have ends, it is called a "**Line Segment**".

Ray



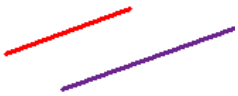
When it has just **one end** it is called a "**Ray**".

Perpendicular Lines



Lines that are at right angles (90°) to each other
are perpendicular.

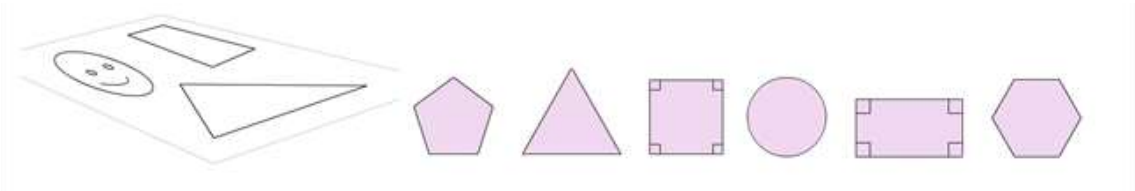
Parallel Lines



Two lines on a plane that **never** meet.
They are always the **same** distance apart.
Here the **red** and **purple** line segments are parallel.

2D shapes

Shapes that you can draw on a piece of paper are 2D shapes.

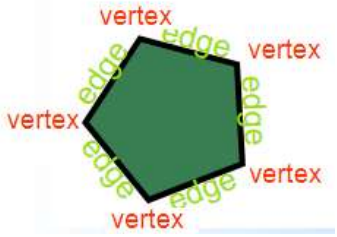


Vertex and Edge

A **vertex** (plural: **vertices**) is a point where two or more lines meet.

An **edge** is a line segment that joins two vertices.

And this pentagon has 5 vertices and 5 edges.



Polygons

Polygons are 2D shapes.
They are made of straight lines,
and the shape is "closed"
(all the lines connect up).

Polygon
(straight sides)

Not a Polygon
(has a curve)

Not a Polygon
(open, not closed)

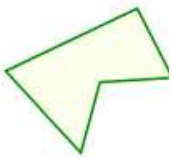
Regular or Irregular

A **regular** polygon has all angles equal and all sides equal, otherwise it is **irregular**

Concave or Convex

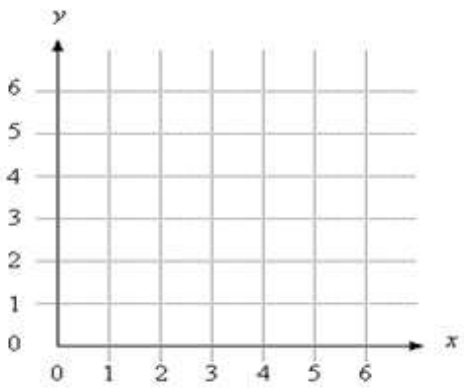
A **convex** polygon has no angles pointing inwards.
More precisely, no internal angle can be more than 180°.
If any internal angle is greater than 180°
then the polygon is **concave**.
(*Think: concave has a "cave" in it*)

Convex



Concave

Co-ordinate Grid

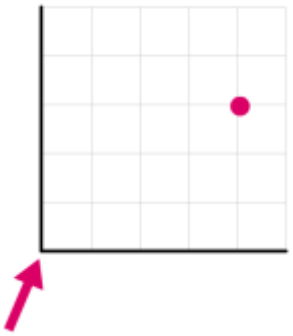


A **coordinate grid** has two perpendicular lines, or axes, labeled like number lines.

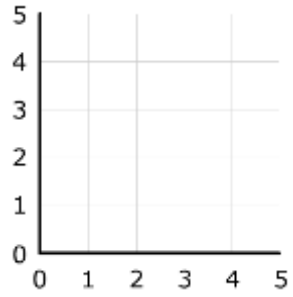
The x-axis and the y-axis.

The point where the x-axis and the y-axis intersect is called the origin.

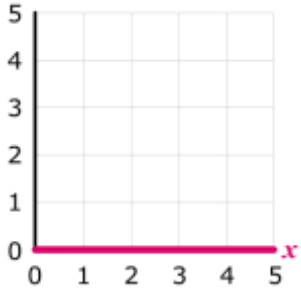
Describing a point



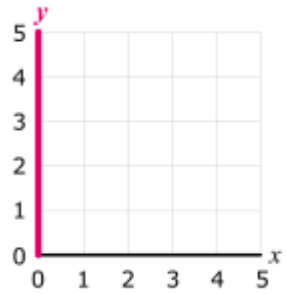
The starting point is the bottom left corner.
First go across, then up.
This point is at 4 across and 3 up.
The coordinate of this point is:
$(4, 3)$



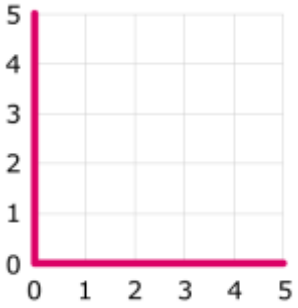
We write numbers on the gridlines so we don't have to count.



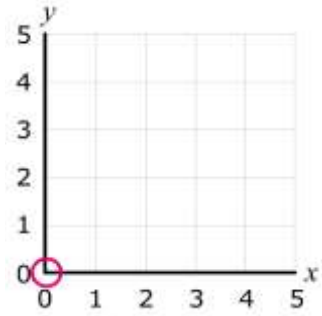
The horizontal axis is often called the x-axis.



The vertical axis is often called the y-axis.



The lines where the numbers appear are called the axes.
(Axes is plural of axis)



The point labeled 0 where the axes meet is the origin.

Position of a point

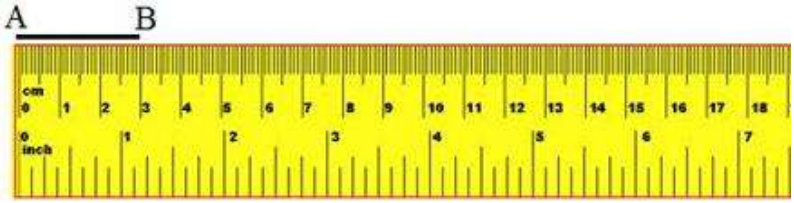
The coordinates of a point are a pair of numbers that define its exact location on a coordinate grid. The coordinates of a given point represent how far along each axis the point is located.

Here we see the point $(\mathbf{12}, \mathbf{5})$

SKILLS

Measure line segment using ruler

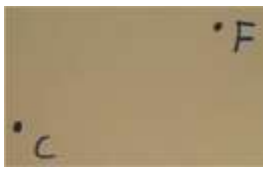
Let there be a line-segment AB.
We have to measure its length.



The scale is placed along the line-segment putting its zero (0) mark at A. We see the end B is at the 3 cm mark of the scale. So the length of the line-segment AB = 3 cm.

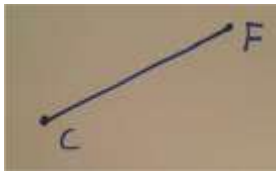
Draw line segment using ruler or straight edge

A line-segment has two end points.



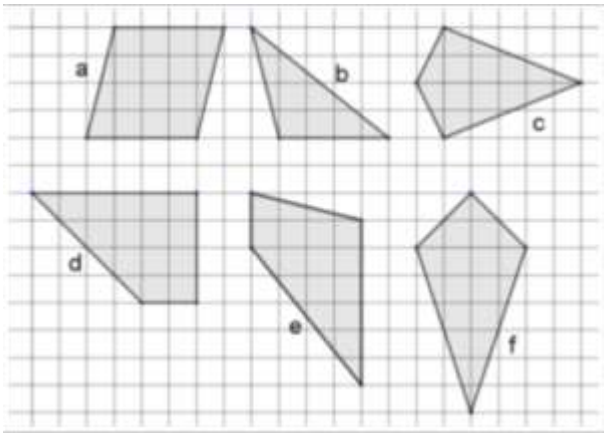
Mark two points and label them.

Use the ruler or straight edge to join the points.



This is how you draw a line segment.

Drawing 2D shapes on a grid



Drawing 2D shapes on a coordinate grid