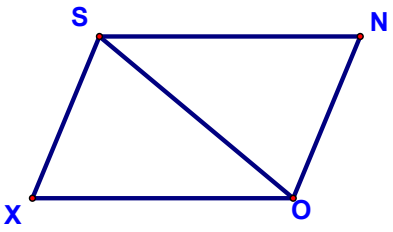
Four Sided Polygons - Lesson 5-4

Here's today's warmup!

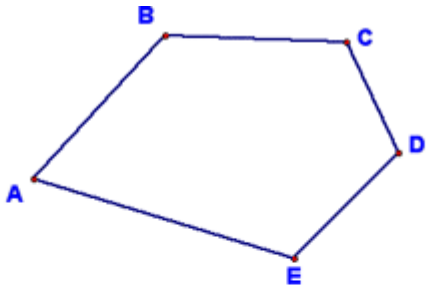
Given: $\overline{SX} \parallel \overline{NO}$
$\angle NSX \cong \angle NOX$

Prove: $\overline{SN} \parallel \overline{XO}$



Statements	Reasons

Today, we're going to define a whole bunch of stuff. Let's start with polygons and things related to them:



A *polygon* is a closed geometric figure in a plane, formed by connecting line segments endpoint to endpoint with each segment intersecting exactly two others.

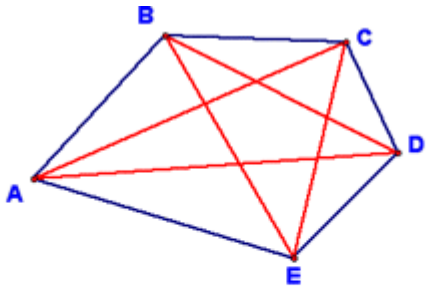
Each segment is called a *side* of the polygon and each endpoint where the sides meet is called a *vertex* of the polygon.

If two vertices of a polygon are connected by a side, then they are *consecutive vertices*.

If two sides share a common vertex, then they are *consecutive sides*.

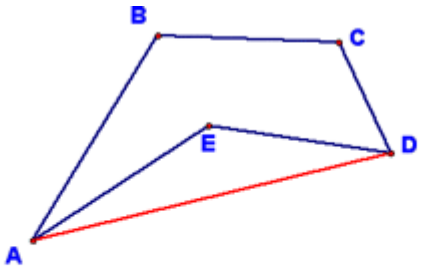
If two angles share a common side, then they are *consecutive angles*.

Next, we'll discuss diagonals of polygons and how these can be used to define *convex* and *concave* polygons:



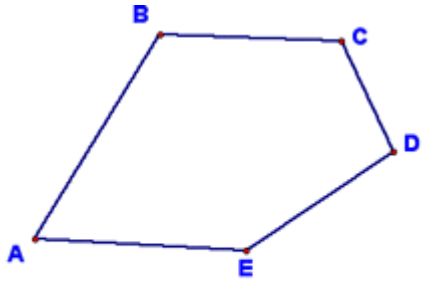
A *diagonal of a polygon* is a segment connecting any two non-consecutive vertices.

A *convex polygon* is a polygon in which each interior angle has a measure less than 180° (no segment connecting two vertices is outside the polygon).



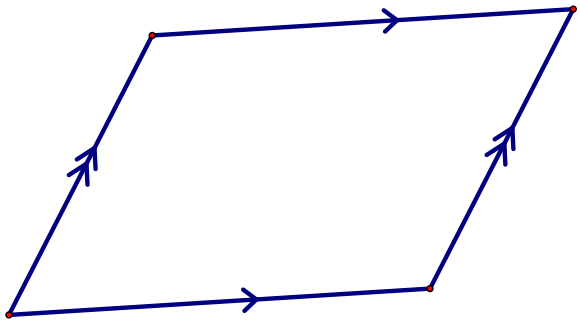
A *concave polygon* is a polygon in which at least one interior angle measures more than 180° (at least one segment connecting two vertices is outside the polygon).

Now let's talk about how we name polygons...essentially, you pick any vertex and name all the vertices in order from there in either direction. Just make sure to use all the vertices and don't mess up the order, and you'll be all set!

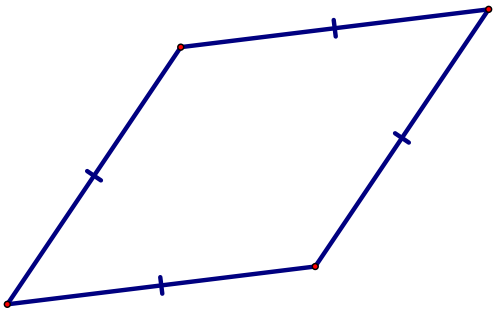


Polygon *ABCDE* or polygon *CDEAB*, etc.

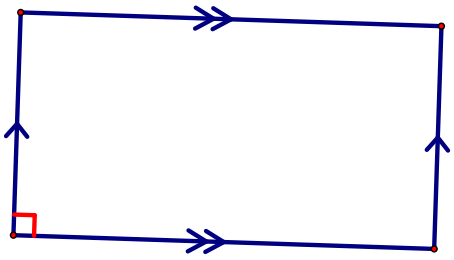
Now we're going to move on to define a bunch of special parallelograms...make sure you know these definitions, as we'll be going through a number of properties for each of these and you'll have to know when something is due to the definition vs. being due to a property!



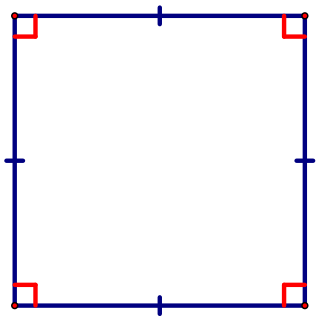
A ***parallelogram*** is a quadrilateral in which both pairs of opposite sides are parallel.



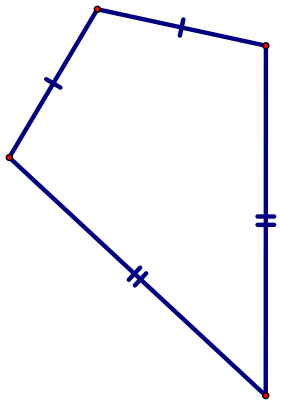
A ***rhombus*** is an equilateral parallelogram.



A ***rectangle*** is a parallelogram in which at least one angle is a right angle (an equiangular parallelogram).



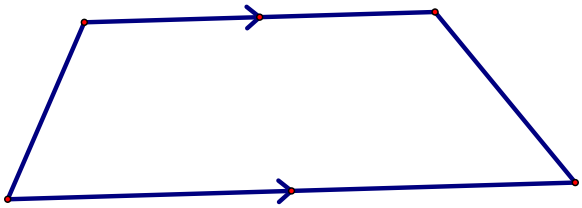
A ***square*** is a parallelogram that is both a rectangle and a rhombus
(an *equiangular rhombus* or an *equilateral rectangle)*.



A ***kite*** is a quadrilateral with exactly two pairs of distinct congruent consecutive sides.

The angles between each pair of congruent sides are called the ***vertex angles***.

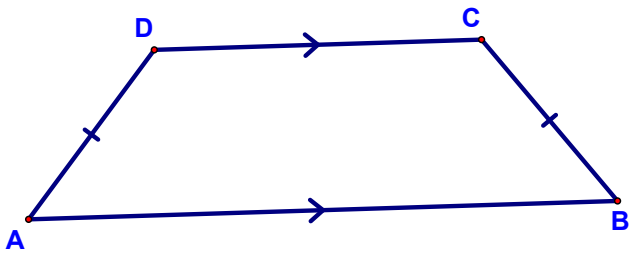
The angles between each pair of non-congruent sides are called the ***nonvertex angles.***



A ***trapezoid*** is a quadrilateral with exactly one pair of parallel sides.

The parallel sides are called ***bases***.

The pair of angles that share a base as a common side are called a pair of ***base angles.***



An *isosceles trapezoid* is a trapezoid in which the nonparallel sides (legs) are congruent.