Quadrilateral - a four-sided shape consisting of four vertices. It contains two sets of opposite sides and opposite angles.

Convex quadrilateral - each vertex lies in the interior of the opposite angle.

Crossed quadrilateral - two of the diagonals are outside of the quadrilateral.

Concave quadrilateral - a quadrilateral that is neither convex nor crossed.

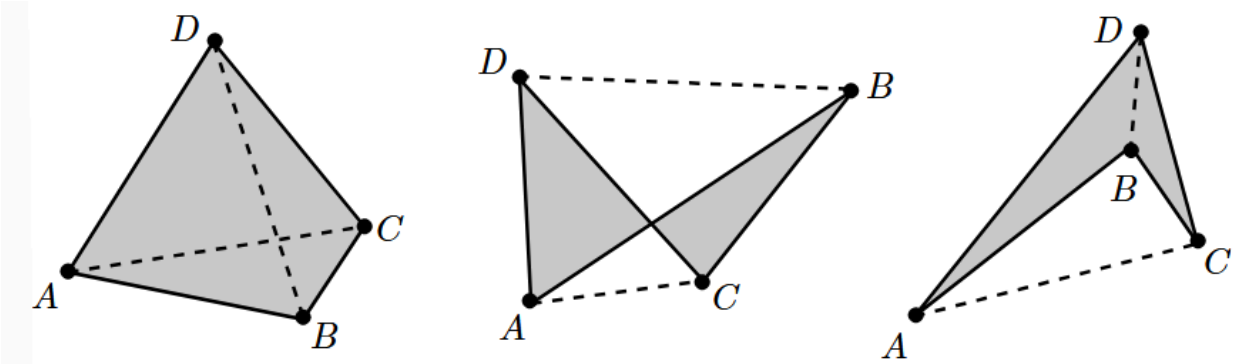

Figure 6.1. Convex, crossed, and concave

Varignon's Theorem - a quadrilateral formed by the midpoints of another quadrilateral is a parallelogram.

Cyclic quadrilateral - a quadrilateral whose vertices all lie on a circle and is convex.

Euclid's theorem and its converse - The opposite angles of a cyclic quadrilateral are supplementary and if opposite angles are supplementary then the quadrilateral can be circumscribed by a circle.

Area of a cyclic quadrilateral - Given *a, b, c, d* as the lengths of the sides of a cyclic quadrilateral and *s* to be defined as

$$s = .5(a + b + c + d)$$

the area can be found with the following formula

$$\alpha(\square ABCD) = \sqrt{(s-a)(s-b)(s-c)(s-d)}$$

Parallelogram - opposite sides are parallel and congruent. The diagonals bisect each other.

Rhombus - a parallelogram where the diagonals create right angles

Rectangle - a parallelogram where the diagonals are the same length

Square - a parallelogram where the diagonals are both the same length and create right angles