CH1 E3

2 cyclic permutation

\( \square ABCD = \square BCDAA = \square CDAB \ldots \)

\( = \square DCBA = \square CBDA = \ldots \)

↑ reversed order

\( \square ABCD \) in reversed order

(a) The angles of \( \square ABCD \) are \( \angle DAB, \angle ABC, \angle BCD \)

and \( \angle CDA \).

(b) Two sides are adjacent if they intersect at a vertex.

(c) Two sides are opposite if they do not intersect.

(d) A diagonal is a segment connecting two vertices but not a side of \( \square ABCD \).

(e) A quadrilateral is a parallelogram if opposite sides are parallel.

CH1 ME 1

(a) Draw a circle center at \( A \) & thru \( B \)

Draw another circle center at \( B \) & thru \( A \)

These two circles meet at \( C \) & \( D \). \( CD \) is the perpendicular bisector of \( AB \).
(b) Draw a circle with center P. This circle meets f at two points A, B. Draw a bisector of AB as in (a).

(c) Draw a large circle center at P and meeting l at two points A and B. Draw a bisector of AB as before.

(d) First use (c) to draw a perpendicular line thru P to f. Use (b) to draw a perpendicular line to n thru P. Then m \parallel l.

(e) Draw a circle with center A. This circle
meets two sides at C & D. Use (a) to draw a bisector of CD. This is also a bisector for ∠A.

(f) Draw a circle with center D and radius AC;

Draw another circle with center E & radius BC.

These two circles meet at two points.

Use either as F.

(g) Draw a circle with center at D with radius BC.

This circle intersects the ray DE at E'.

Draw another circle with center E' and radius CA

These two circles meet at two points.

Use either as F.
(a) Construct quadrilateral ABCD using part (b) in the previous problem.

(b) Construct the midpoint of AB as in Part (a) of the previous problem.

(c) Draw a circle with center M and radius MC that meets \( \overrightarrow{AB} \) at E.

(d) Drop a perpendicular EF onto DC with foot F (as in the previous problem).

(e) \[ MC = ME = \sqrt{MB^2 + BC^2} = \sqrt{\frac{1}{4} BC^2 + BC^2} = \frac{\sqrt{5}}{2} BC \]
   \[ AE = AM + ME = \frac{1}{2} BC + \frac{\sqrt{5}}{2} BC = \frac{1 + \sqrt{5}}{2} BC \]

(f) \[ BE = ME - MB = \frac{\sqrt{5}}{2} BC - \frac{1}{2} BC = \frac{\sqrt{5} - 1}{2} BC \]

\[ BC = \frac{2}{\sqrt{5} - 1} \]
\[ BE = \frac{2(\sqrt{5} + 1)}{(\sqrt{5} - 1)(\sqrt{5} + 1)} BE = \frac{\sqrt{5} + 1}{2} BE \]