6-24 a) The sum of the angles of an octagon is 1080°.
   \((8-2) \times 180 = 6 \times 180 = 1080°\)
   There are 8 sides, so each angle is \(1080° \div 8 = 135°\)

b) \(\frac{(9-2) \times 180}{9} = \frac{1260}{9} = 140°\)  
   \(\frac{(100-2) \times 180}{100} = \frac{17640}{100} = 176.4°\)

c) yes \(\frac{(n-2) \times 180}{n}\)

8-25 a) **No**, not if the polygon has more than 3 sides.
A Rhombus can be found without 70° L's.

b) **No**, not if the polygon has more than 3 sides.
A non-regular rectangle is a polygon that is
   equivalent to a 90°-45°-45° triangle but not equilateral.

8-26 a) Yes, because they are supplementing to \(\pi\) interior L's.

b) \(\frac{(n-2) \times 180}{6} = \frac{4 \times 180}{6} = 120°\)

   Each interior L is 120°. So its exterior L is 180 - 120 = 60°

c) Sum of 6 exterior L's in 60° \(\times 6 = 360°\)

d) 1) equilateral \(\Delta\)  2) regular octagon  3) regular decagon  4) regular 12-gon
   \(\frac{(3-2) \times 180}{3} = 60°\)  \(\frac{(8-2) \times 180}{8} = 135°\)  \(\frac{(10-2) \times 180}{10} = 144°\)  \(\frac{(12-2) \times 180}{12} = 150°\)

   180° - 60° = 120°  180° - 135° = 45°  180° - 144° = 36°  180° - 150° = 30°

   3 \times 120° = \(360°\)  8 \times 45° = \(360°\)  10 \times 36° = \(360°\)  12 \times 30° = \(360°\)

\(\text{The sum of exterior L's in any shape is } 360°\)

\(\text{e) The sum of the exterior angles of a polygon is } 360°\).

8) As you copy the exterior L's of any shape next to each other, they form a circle.

See resource page!

8-27 a) \(360 \div 40 = 9\) \(\rightarrow\) Nonagon

b) \(2520 \div 180 = 14\)
   So \(16\) sides

c) Not possible - the quadrilateral may not be a regular polygon.
   It might be concave also.

d) 1740° because sum of exterior L's = 360°
   \(360° \div 360° = 1°\) for each L.
   Length 1740° for each interior L.
Lesson 8.1.3 Resource Page

Sum of the Exterior Angles of a Polygon

also can be done using technology

Confirm your conjecture from part (e) by following the directions below.

**Directions:** For each polygon, start by tracing one exterior angle on tracing paper. Then move the tracing paper to another exterior angle and place it so that the vertices coincide (lie on top of one another) and the angles are adjacent. Then copy the second angle on the tracing paper. Continue to do this until you have copied all adjacent angles. Once you are finished, examine the result. Did the result confirm your conjecture from part (e) of problem 8-24?

(1) Triangle

All together 360°!

(2) Quadrilateral

(3) Pentagon

360°

(4) Regular Hexagon

Chapter 8: Polygons and Circles
8-28. Interior & Exterior Angles of a Polygon

Interior ∠s of a regular polygon
\[
\frac{(n-2) \times 180}{n}
\]

Exterior ∠s of a polygon = 360°
Always!

8-29. a) \[ \begin{array}{c}
\text{S} \\
11 \\
5 \\
\text{T}
\end{array} \]

\[ P = 2 + 5 + 10 + 11 = 28 \text{ ft} \]
\[ A = \frac{1}{2} (2 \times 11) + \frac{1}{2} (5 \times 10) \]
\[ = 11 + 25 = 36 \text{ sq ft} \]

b) \[ \begin{array}{c}
20 \\
20 \\
A = 200 + 400 = 600 \text{ sq cm} \\
C \approx 2828
\end{array} \]

8-30. \[ \begin{array}{c}
P \\
Q \\
R
\end{array} \]

\[ \begin{array}{c}
PQ = RS \\
PR = SQ \\
QR = QR
\end{array} \]

SSS \Rightarrow \triangle PQR \cong \triangle SQR

8-31. a) Isosceles ∆'s
b) Central vertex is \(360 \div 10 = 36°\)

To form two ∆'s must be equal such as ∆ is isosceles.

Therefore \((180° - 36°) \div 2 = 72°\)

\[ 36° + 72° + 72° \]
8.32. \( B(14,10) \)

5) \( \frac{3}{4} \) (AD is \( \frac{3}{8} \), DE is \( \frac{1}{8} \))

5a) AE is \( \frac{3}{8} \)

6) C: \( \left( \frac{2+14}{2}, \frac{2+10}{2} \right) \)

7) C: \( (8,6) \)

8) D: \( \left( \frac{2+8}{2}, \frac{2+6}{2} \right) \)

9) D: \( (5,4) \)

3) \( \left( \frac{5+8}{2}, \frac{4+6}{2} \right) \)

4) \( \left( \frac{5+5}{2}, \frac{4+5}{2} \right) \)

8.34

a) The shape can be rearranged to be a rectangle with dimensions 14 x 7.

b) 14 \times 7 = 98 square units

8.35

B: SAS

8.33

5) \( x + x + 82 = 180 \)

6) \( 2x + 82 = 180 \)

7) \( 2x = 98 \)

8) \( x = 49 \)

36 = 36°

b) \( 71 + 71 + x = 180° \)

9) \( x = \frac{180 - 71 - 71}{2} \)

10) \( x = 38° \)