Finding the Angle Measures in Polygons
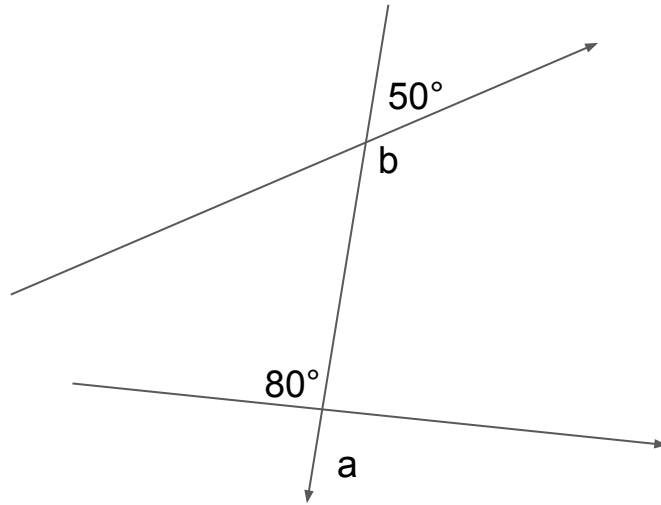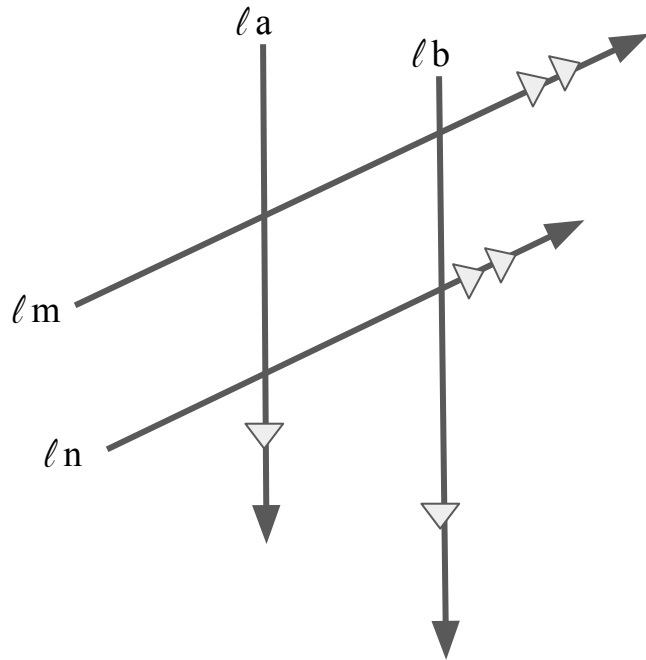
Using the diagram and the angles given, can we identify the measures of other angles?
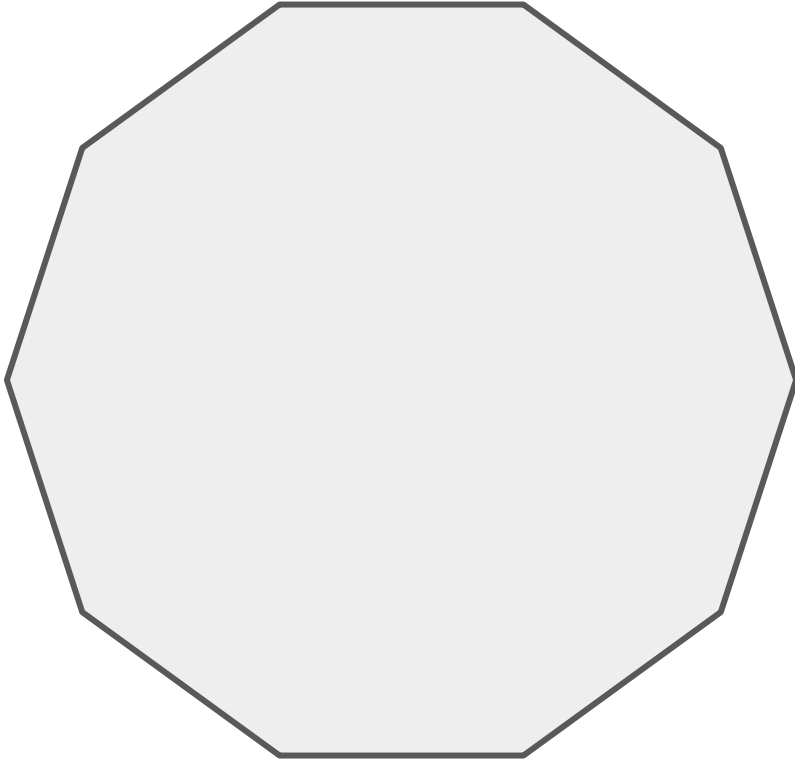

50°

b

80°

a

ℓ a

ℓ b

ℓ m

ℓ n

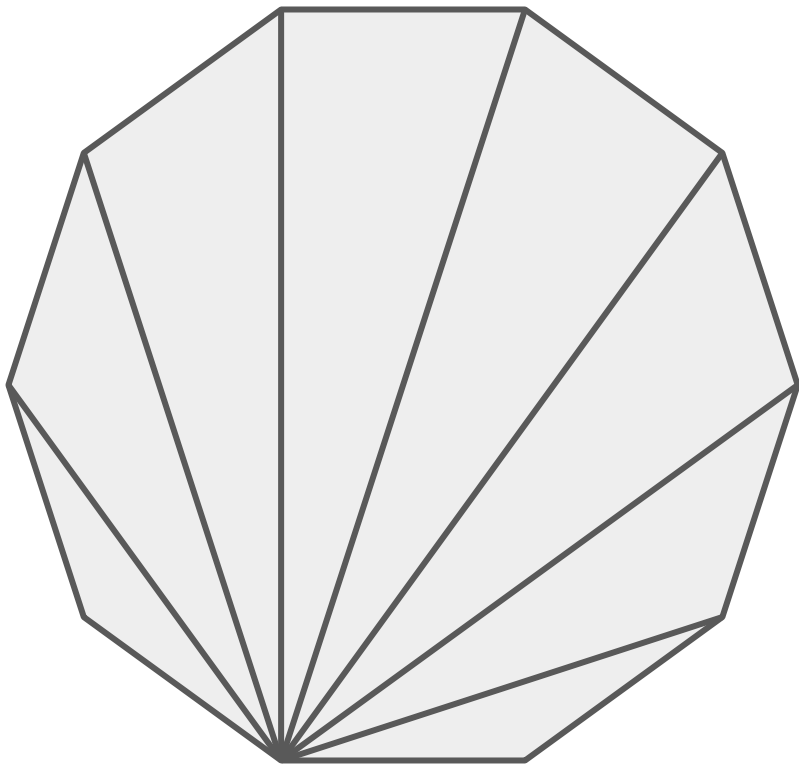What do we know about lines *a* and *b*?

What do we know about lines *m* and *n*?

Which of these angles are congruent?

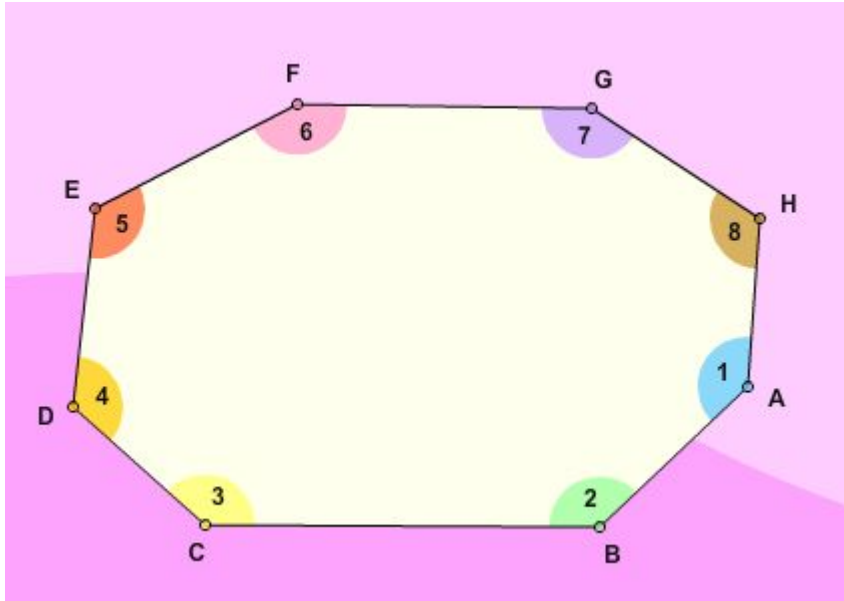Can we find the sum of the interior angles for this polygon?

Can we find the sum of the interior angles for this polygon?
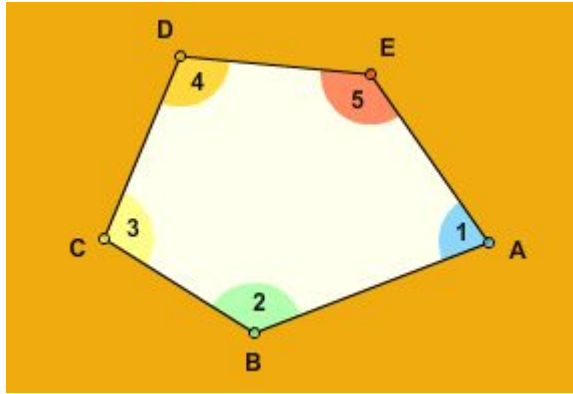
Theorem 8.1 Polygon Interior Angles Theorem

The sum of the measure of the interior angles of a convex n-gon is: $(n - 2) * 180°$

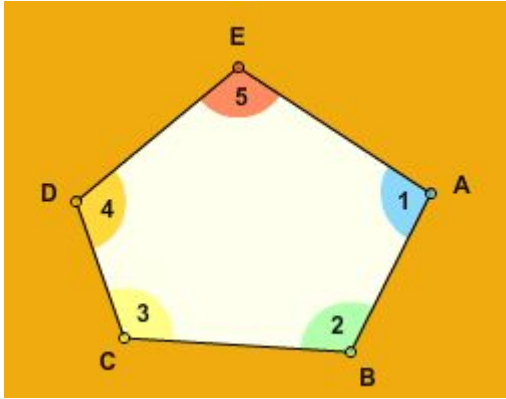$$m\angle1 + m\angle2 + ... m\angle n = (n - 2) * 180°$$

What is the sum of the measures of the interior angles for this *irregular* octagon?

What is the sum of the measures of the interior angles for this irregular pentagon?

Find the value of the missing angles:
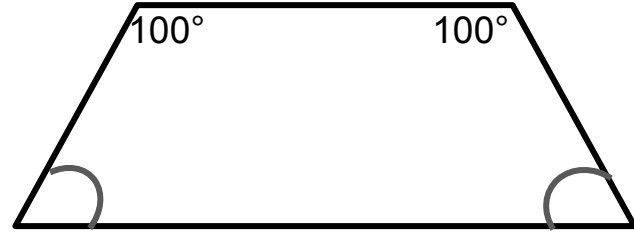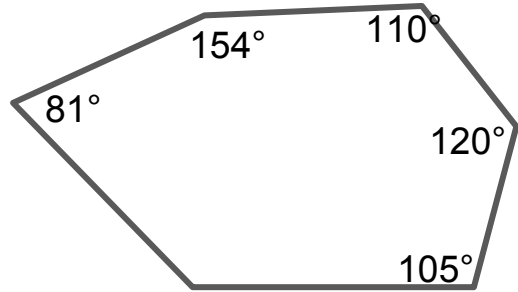

$m\angle 1 = 96°$

$m\angle 2 = x$

$m\angle 3 = x$

$m\angle 4 = 112°$
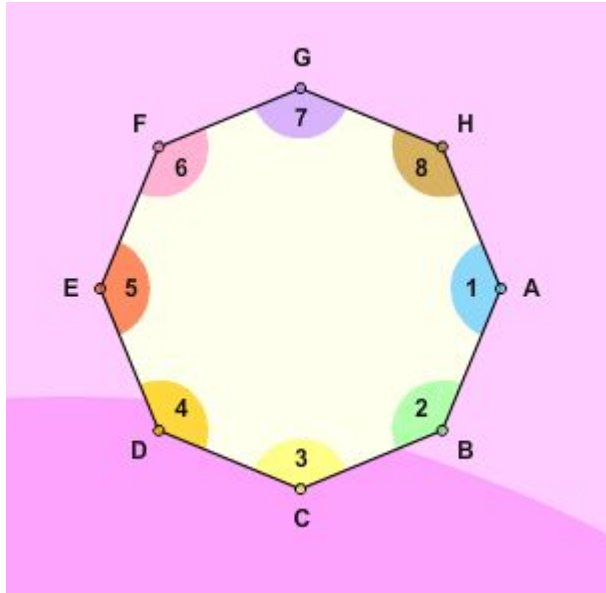
$m\angle 5 = 108°$
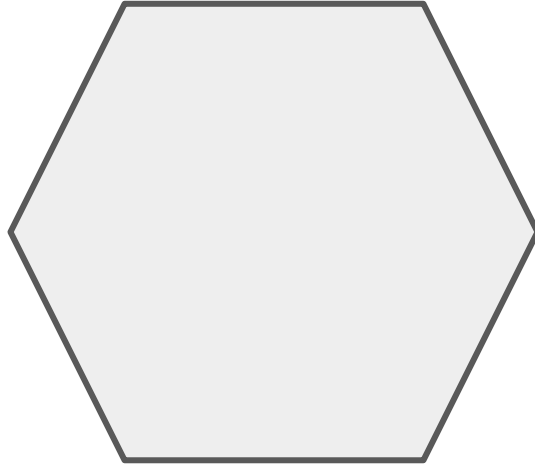
What is the value of x?

Find the missing values

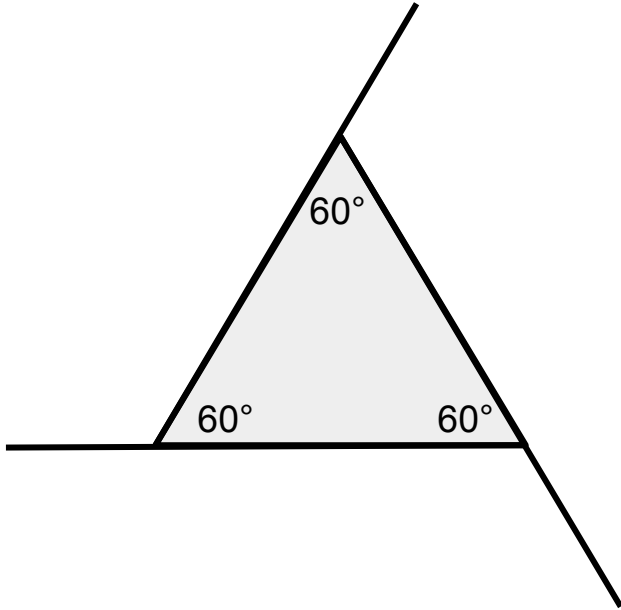What is the measure of one interior angle for this *regular* octagon?

Can we derive a general formula for finding the measure of 1 angle of a regular n-gon?

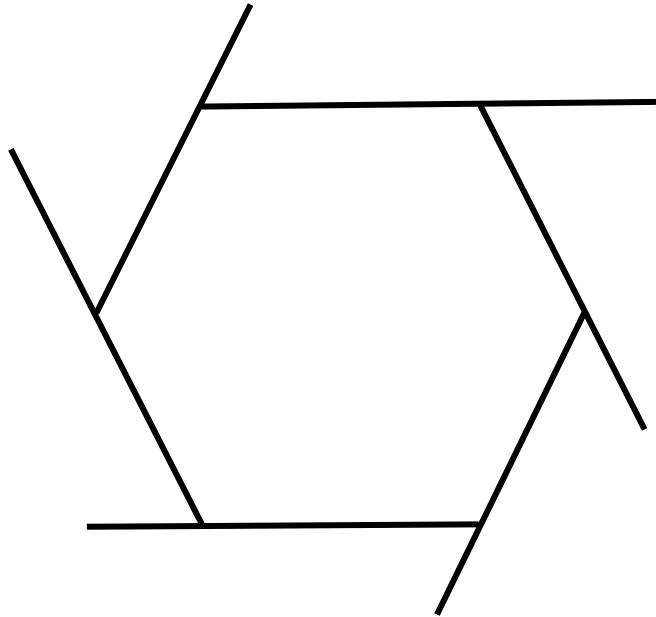What is the measure of one interior angle for this *regular* hexagon?

Sum of Exterior Angles

60°

60°   60°

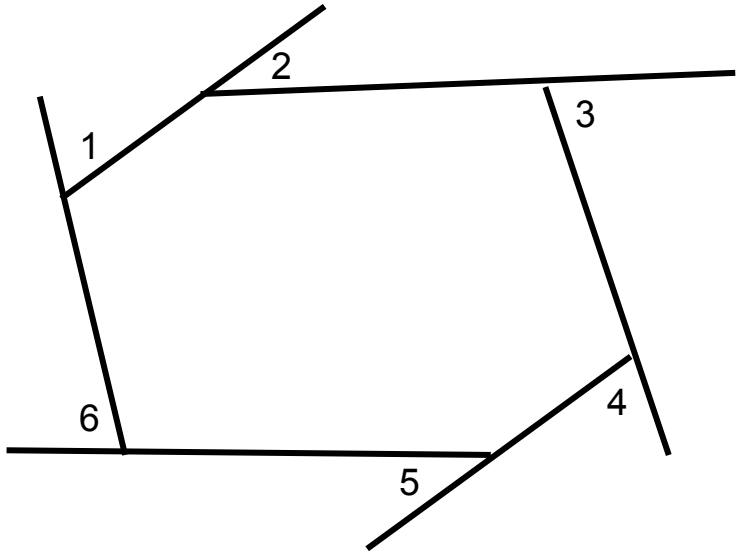What is the sum of the exterior angles for this triangle?

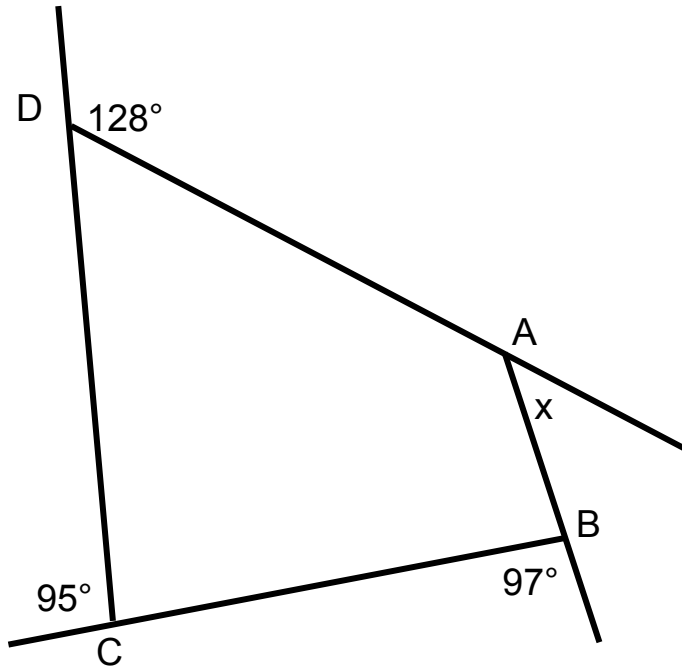What is the sum of the exterior angles for this regular hexagon?

Theorem 8.2 Polygon Exterior Angle Theorem

The sum of the measures of the exterior angles of a convex polygon, one angle at each vertex, is 360°.

$$m\angle1 + m\angle2 + m\angle3 + m\angle4 + m\angle5 + m\angle6 = 360°$$

What is the value of the missing angle?

D
128°

A
x

B
97°

95°
C

Solve for x

60°

78°

81°

34°

x

x + 27