Unit 11: Angles, Triangles, and Quadrilaterals

Friendly Notes

Looking Back

A protractor is used to measure angles.

1. Measure angle ABC.

Place the baseline of the protractor on the horizontal line of the angle and make sure the center mark touches point B.

\[ \angle ABC = 130^\circ \]

Read the outer scale.
2. Measure $\angle DEF$.

$m\angle DEF = 60^\circ$

3.

(a) Sally starts facing north and turns clockwise 90°, which direction is she facing?
(b) Sally then turns counter clockwise to south-west. What angle does she turn through?
(c) After turning clockwise through 135°, Sally ends up facing south. Which direction was she facing at the start?

(a) She is facing east.
(b) She turns through 225°.
(c) She was facing north-east.
Finding Unknown Angles

Vertically opposite angles are equal.  
The sum of the angles on a straight line is 180°.

1. In the figure, POR and SOT are straight lines. Find 
   (a) m∠POT, and 
   (b) m∠TOR.

   (a) m∠POT  = m∠SOR
              = 55° + 65°
              = 120°

   (b) m∠TOR  = 180° − 55° − 65°
              = 60°
2. Find \( m\angle p \) in the figure.

\[
m\angle p = 360° - 100° - 31° - 75° - 115° = 39°
\]

The marked angles meet at a common point.

The sum of the angles that meet at a common point is 360°.
Finding Unknown Angles in Triangles

The three angles of a triangle add up to 180°.

1. In triangle PQR, m\(\angle PQR = 55°\) and m\(\angle PRQ = 62°\). Find m\(\angle QPR\).

\[
m\angle QPR = 180° - 55° - 62° = 63°
\]

The exterior angle of a triangle is equal to the sum of its interior opposite angles.

2. In triangle ABC, BC is extended to D, m\(\angle CAB = 74°\), and m\(\angle ABC = 33°\). Find m\(\angle ACD\).

\[
m\angle ACD = 74° + 33° = 107°
\]
Isosceles and Equilateral Triangles

An isosceles triangle has 2 equal sides. The angles opposite the equal sides are equal.

1. In triangle XYZ, XY = XZ, \( m\angle XYZ = 34^\circ \), and WXY is a straight line. Find \( m\angle WXZ \).

\[
m\angle XZY = m\angle XYZ = 34^\circ \\
m\angle WXZ = 34^\circ + 34^\circ = 68^\circ
\]

An equilateral triangle has 3 equal sides and 3 equal angles. Each angle is 60°.

2. In the figure, EBD and ABC are straight lines. Find \( m\angle ABE \).

\[
m\angle DBC = 60^\circ \\
m\angle ABE = m\angle DBC = 60^\circ
\]
Finding Unknown Angles in Quadrilaterals

The angles of a quadrilateral add up to 360°.

Find $m\angle x$ in the quadrilateral.

$m\angle x = 360° - 78° - 100° - 105°$

$= 77°$
Parallelograms, Rhombuses, and Trapezoids

The opposite angles of a parallelogram are equal. Each pair of angles between two parallel sides add up to 180°.

Find $m\angle y$ in the parallelogram.

$m\angle y = 110°$

$m\angle z = 180° - 110°$

$= 70°$