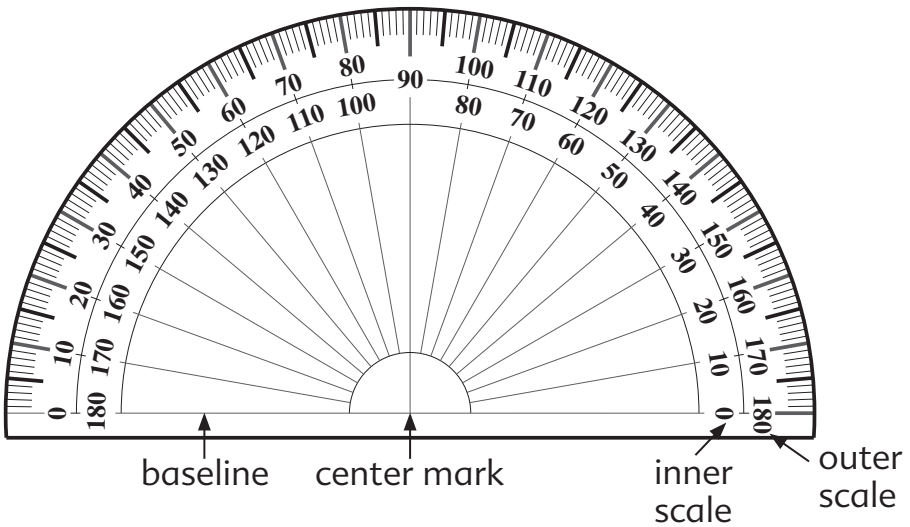
Unit 11 : Angles, Triangles, and Quadrilaterals

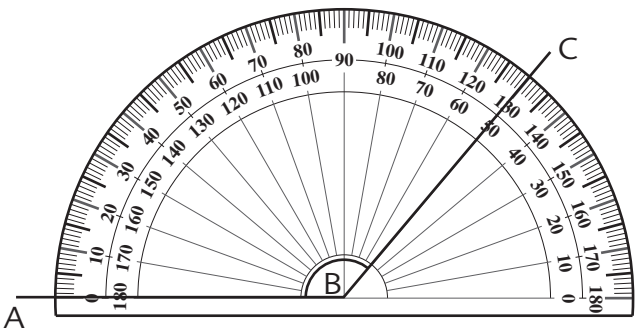
Friendly Notes

Looking Back

A **protractor** is used to measure angles.



1. Measure angle ABC.

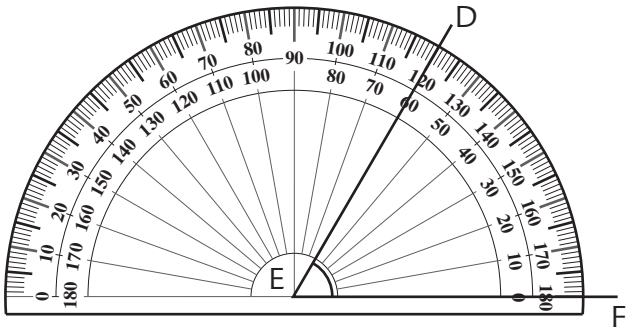


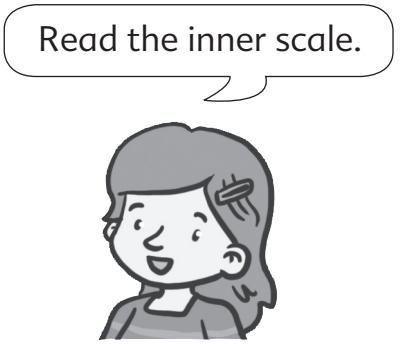
Place the baseline of the protractor on the horizontal line of the angle and make sure the center mark touches point B.

$m\angle ABC = 130°$

Read the outer scale.

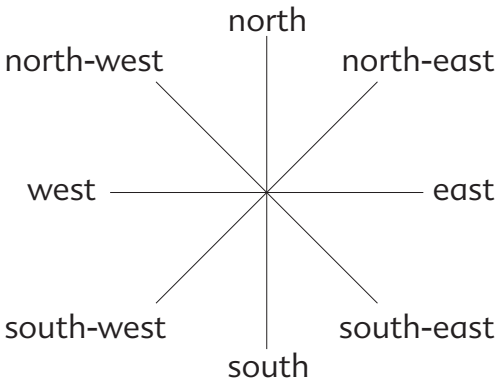
2. Measure ∠DEF.





m∠DEF = 60°

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.

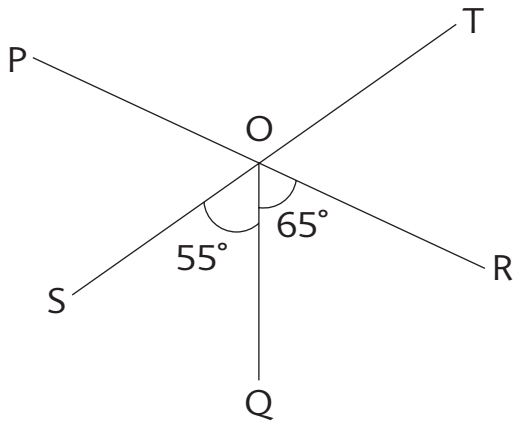
(b) She turns through 225°.

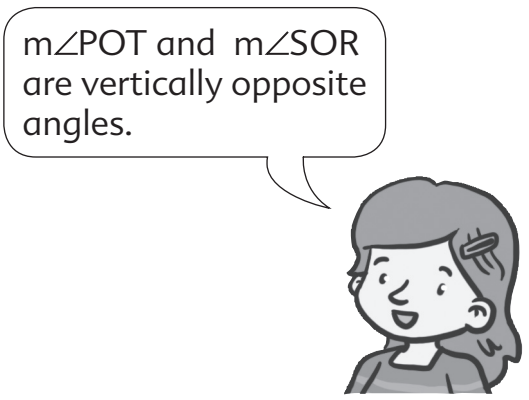
(c) She was facing north-east.

Finding Unknown Angles

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

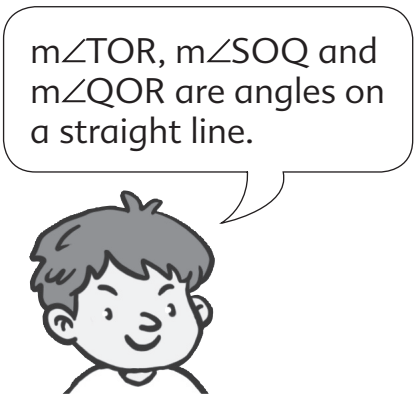
1. In the figure, POR and SOT are straight lines. Find
   (a) m∠POT, and
   (b) m∠TOR.



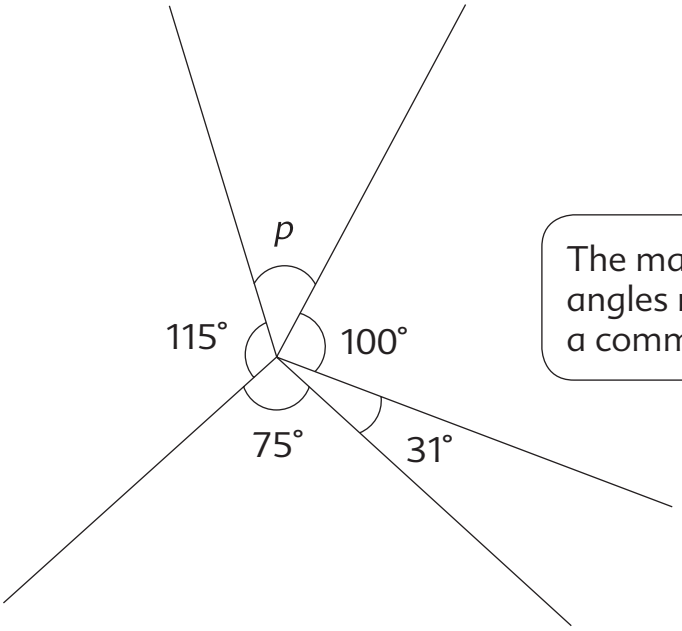


(a) $m\angle POT = m\angle SOR$
$= 55° + 65°$
$= 120°$

(b) $m\angle TOR = 180° - 55° - 65°$
$= 60°$



2. Find m∠p in the figure.

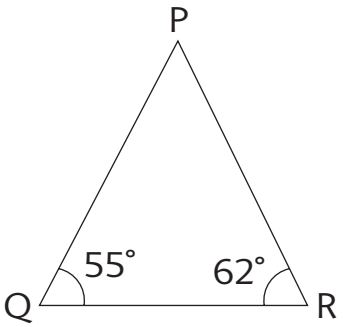


$$\begin{aligned} m\angle p &= 360^\circ - 100^\circ - 31^\circ - 75^\circ - 115^\circ \\ &= 39^\circ \end{aligned}$$

Finding Unknown Angles in Triangles

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

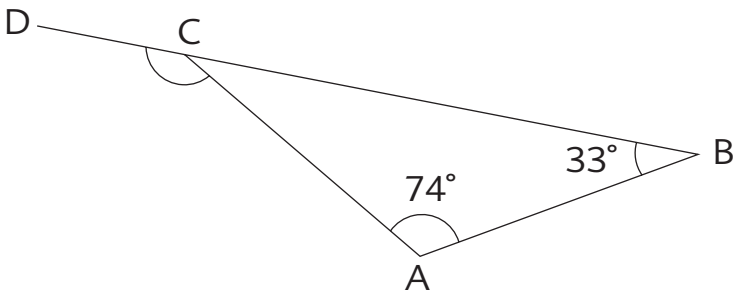
1. In triangle PQR, m∠PQR = 55° and m∠PRQ = 62°. Find m∠QPR.



$$m\angle QPR = 180° - 55° - 62°$$
$$= 63°$$

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∠CAB = 74°, and m∠ABC = 33°. Find m∠ACD.

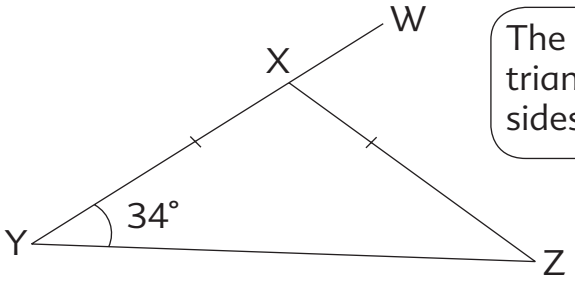


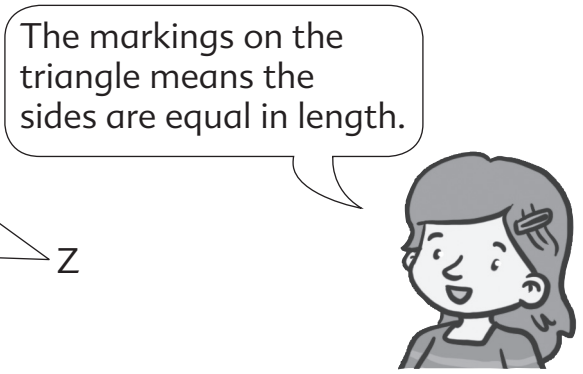
$$m\angle ACD = 74° + 33°$$
$$= 107°$$

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∠XYZ = 34°, and WXY is a straight line. Find m∠WXZ.



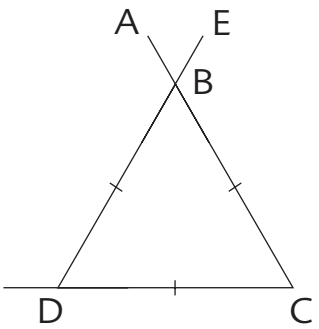


$m\angle XZY = m\angle XYZ$
$= 34°$

$m\angle WXZ = 34° + 34°$
$= 68°$

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∠ABE.



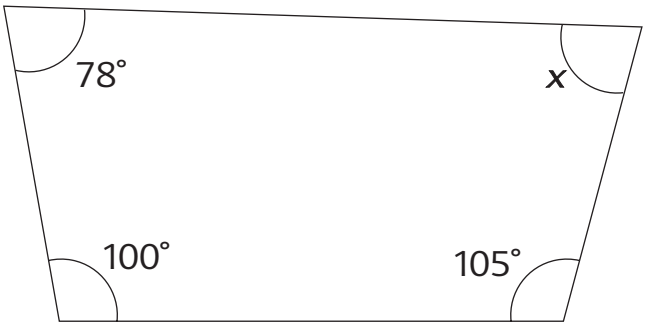
$m\angle DBC = 60°$

$m\angle ABE = m\angle DBC$
$= 60°$

Finding Unknown Angles in Quadrilaterals

The angles of a quadrilateral add up to 360°.

Find m∠x in the quadrilateral.

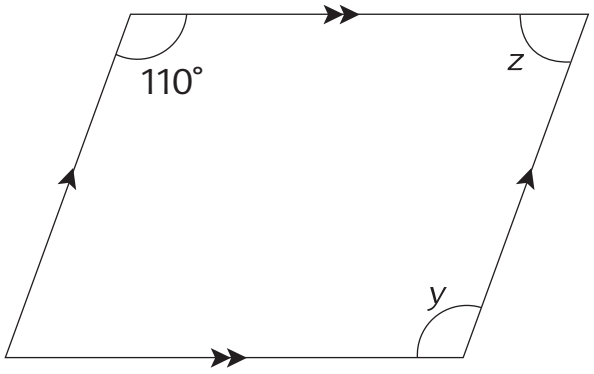


$$m\angle x = 360° - 78° - 100° - 105°$$
$$= 77°$$

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∠y in the parallelogram.



m∠y = 110°

m∠z = 180° − 110°
= 70°