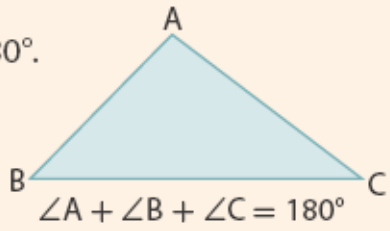
Angles with Triangles

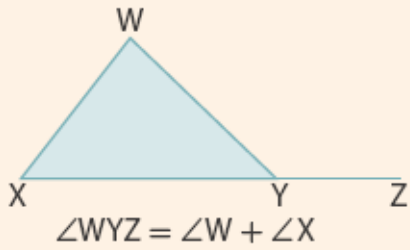
Assigned Work

Key Ideas

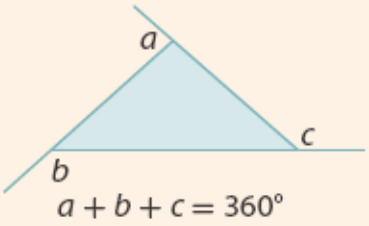
- The three interior angles of any triangle have a sum of 180°.



- To form an exterior angle, extend one side of a triangle. The size of an exterior angle is equal to the sum of the two interior angles opposite it.



- The three exterior angles of any triangle add to 360°.



Apply

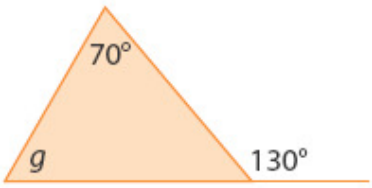
1. **a)** Without measuring, classify the angle at the peak of the garage roof as acute, obtuse, or right.

b) Estimate the measure of the angle at the peak.

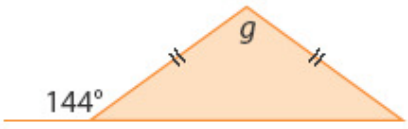
c) The front of the garage roof looks like an isosceles triangle. If the angles at the base of the roof are each 35°, determine the angle at the peak.

2. Determine the measure of g in each diagram.

a)



b)



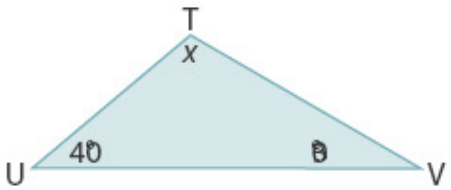
3. **EQAO** What is the value of x in $\triangle TUV$?

A 70°

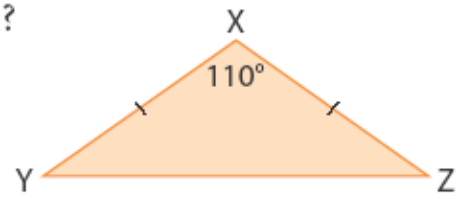
B 110°

C 250°

D 290°



4. **EQAO** What is the size of $\angle Z$ in the triangle shown?



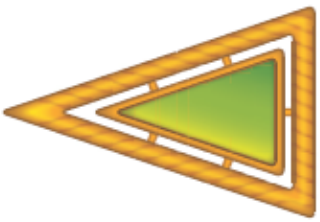
A 110°

B 70°

C 40°

D 35°

5. Deljaye makes a pair of earrings in the shape of an isosceles triangle.



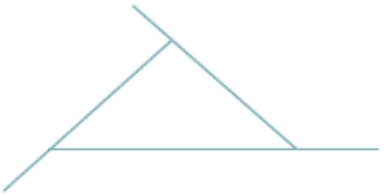
a) She wants the base of the triangle to hang horizontally. Where could she attach the ear post? Explain your reasoning.

b) What is the measure of each interior angle? How do you know?

c) Deljaye makes a new pair of earrings in the shape below. What is the name for the type of triangle shown? Write an equation that relates the sum of the interior angle measures, S, to the measure of each interior angle, x.

6. **Achievement Check**

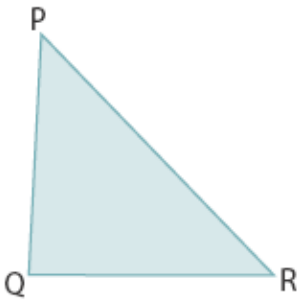
a) With or without technology, create a triangle. Extend one side at each vertex to make three exterior angles. Label the interior angles x, y, and z.



b) Express each exterior angle in terms of the interior angles.

c) What is the sum of the exterior angles? How do you know?

7. Alice is asked to measure the interior angles of the triangle shown and to find their sum. Her solution is below.



$\angle P + \angle Q + \angle R = 47^\circ + 93^\circ + 46^\circ$

$= 186^\circ$

This triangle has interior angles that add up to 186°.

a) Is there an error in Alice's work? How do you know?

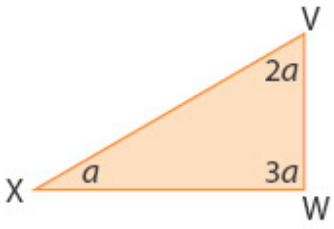
b) If so, explain where you think the error occurred.

8. **a)** Sketch a triangle with angles 60°, 70°, and $(2x + 10)°$.

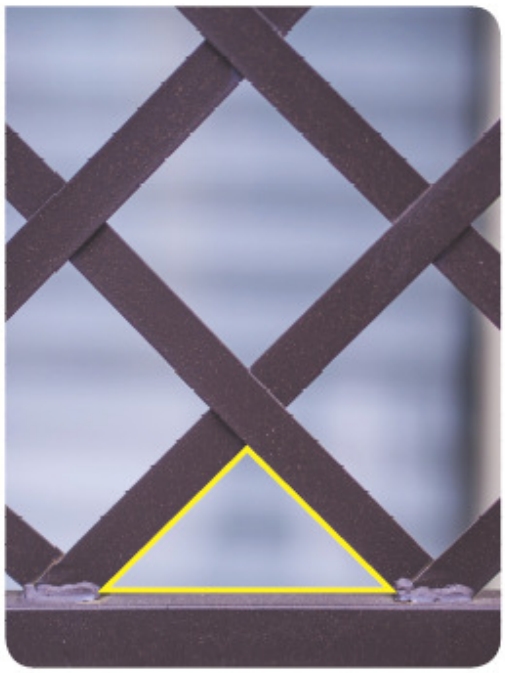
b) What is the value of x?

c) Show that your answer is correct.

9. Solve for a.



10. Look at the triangle at the bottom of the fence. What is the size of each interior angle? Justify your answer.



Processes

Reasoning and Proving

Use what you know about angles and intersecting lines.

Answers

1. a) obtuse **b)** Estimates may vary. 120°
c) 110°
2. a) 60° **b)** 108°
3. B
4. D
5. a) At the top of the earring near the non-base angle.
b) Using a protractor, 38°, 71°, and 71°.
c) equilateral triangle; $S = 3x$
7. a) Yes. The sum of the interior angles of a triangle is always 180°.
b) Answers may vary. Alice misread the protractor at ∠Q; she recorded the angle as 93°, but the angle is less than 90°, so it actually measures 87°.
8. a)

b) 20°
c) Sum of interior angles $= 2x + 10° + 70° + 60°$
$= 2(20°) + 10° + 70° + 60°$
$= 40° + 140°$
$= 180°$
9. 30°
10. The triangle at the bottom is half of one of the rotated squares in the pattern, so it is an isosceles triangle with interior angle measures of 90°, 45°, and 45°.