

Angle Relationships in Triangles and Parallel Lines

Grade 8 math · Test · Standards: 8.G.A.5

Name: _____ Date: _____ Class: _____

This test covers the triangle angle sum, exterior angles, and angles formed by parallel lines and a transversal. It has 8 questions worth 20 points and should take about 45 minutes. Name the angle relationship used in each step.

Standards: 8.G.A.5 · **Level:** Grade 8

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

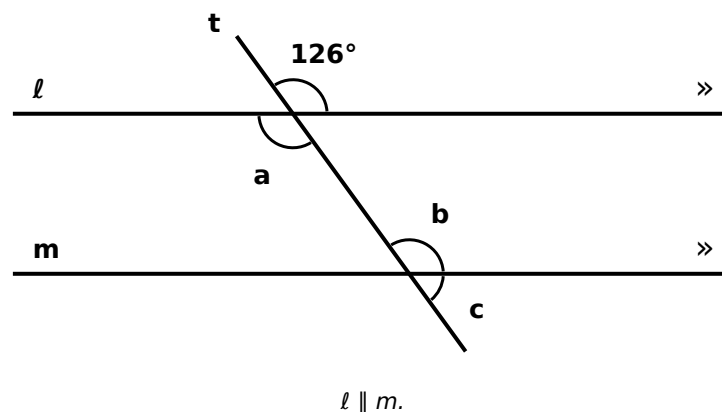
Question 1 Triangle and exterior (2 points)

A triangle has two interior angles of 63° and 54° .

- Find the third interior angle. (1 point)
- Find the exterior angle at the vertex of the third angle. (1 point)

Question 2 Find three angles (3 points)

In the figure, $\ell \parallel m$. Find a , b , and c , and name the angle relationship you used for each.



Question 3 Equation with parallel lines (3 points)

A transversal crosses two parallel lines, and a pair of alternate interior angles measures $(6x - 14)^\circ$ and $(4x + 16)^\circ$. Find x and the measure of each angle.

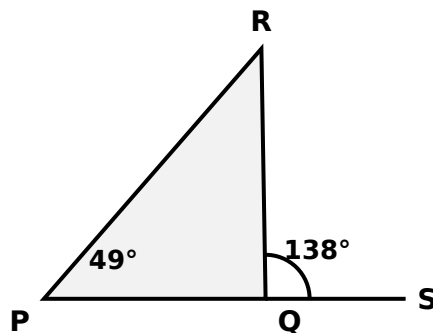
Question 4 Triangle with unknowns (3 points)

The interior angles of a triangle measure $(x + 8)^\circ$, $(2x - 4)^\circ$, and $(3x + 2)^\circ$. Find x and the three

angles.

Question 5 Exterior angle problem (3 points)

In the figure, the exterior angle at Q measures 138° and $\angle P = 49^\circ$.



$\triangle PQR$ with an exterior angle at Q.

- a. Find $\angle R$. (2 points)
- b. Find $\angle PQR$. (1 point)

Question 6 Similar triangles (2 points)

Triangle 1 has angles of 35° and 80° . Triangle 2 has angles of 80° and 65° . Are the triangles similar? Explain.

Question 7 Are the lines parallel? (2 points)

A transversal crosses lines ℓ and m . The same-side interior angles measure 112° and 78° . Are ℓ and m parallel? Explain.

Question 8 Skate ramp (2 points)

The cross-section of a skate ramp is a right triangle with a 90° angle at the wall and an 18° angle at the ground. Find the angle at the top of the ramp, then the exterior angle formed at the top between the ramp and the extended vertical wall.