

Parallel Lines Cut by a Transversal

Grade 10 – Geometry math · Test · Standards: G-CO.C.9

Name: _____ Date: _____ Class: _____

Eight questions, 20 points, 45 minutes. Show every equation, name the angle relationship you use and write units where they apply. Figures are not drawn to scale.

Standards: G-CO.C.9 · **Level:** Grade 10 Geometry

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

Question 1 Name the pairs (2 points)

Lines a and b are cut by a transversal and the angles are numbered as shown.

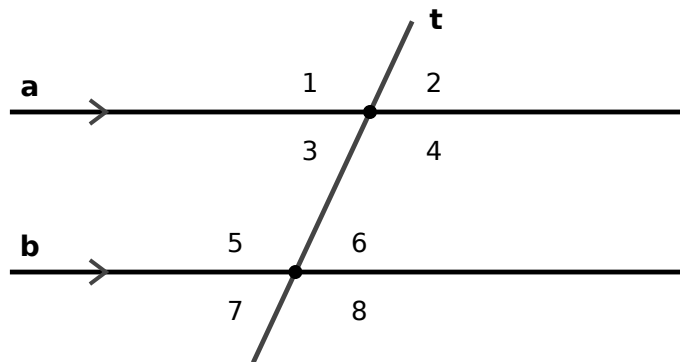


Figure for Question 1.

- Name the relationship of $\angle 4$ and $\angle 5$. (1 point)
- Name the relationship of $\angle 1$ and $\angle 8$. (1 point)

Question 2 Find three angles (3 points)

Lines a and b are parallel and $m\angle 2 = 61^\circ$.

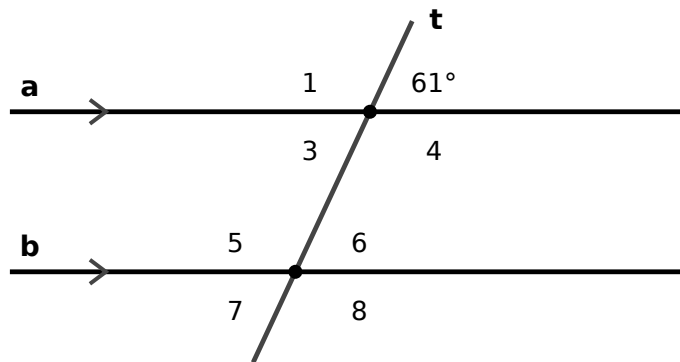


Figure for Question 2.

- a. Find $m\angle 6$. (1 point)
- b. Find $m\angle 4$. (1 point)
- c. Find $m\angle 7$. (1 point)

Question 3 Alternate interior equation (2 points)

Lines a and b are parallel. Alternate interior angles measure $(4x + 11)^\circ$ and $(6x - 19)^\circ$. Find x and the measure of each angle.

Question 4 Decide if lines are parallel (3 points)

A transversal crosses two lines. State whether the lines must be parallel and give a reason.

- a. Corresponding angles measure 76° and 76° . (1 point)
- b. Alternate interior angles measure 64° and 66° . (1 point)
- c. Same-side interior angles measure 105° and 75° . (1 point)

Question 5 Parallel with same-side angles (2 points)

Same-side interior angles formed by a transversal measure $(7x + 4)^\circ$ and $(5x + 20)^\circ$. Find x so that the two lines are parallel, then find both angle measures.

Question 6 Prove lines parallel (3 points)

Given: $\angle 2 \cong \angle 7$. Prove: $a \parallel b$. Use the numbering in the figure and complete a two-column proof.

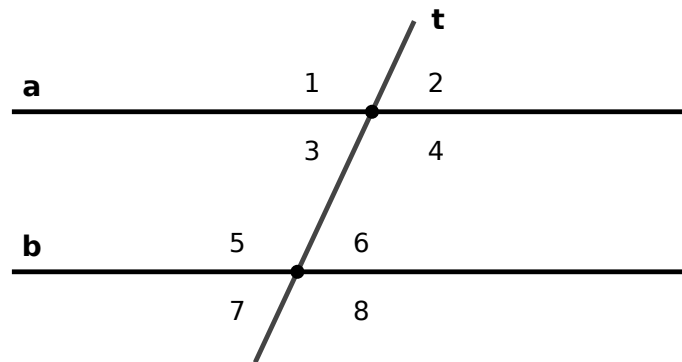


Figure for Question 6.

Question 7 Equidistant point (3 points)

Point P is on the perpendicular bisector of AB , where $AB = 48$. $PA = (2x + 9)$ and $PB = (4x - 7)$.

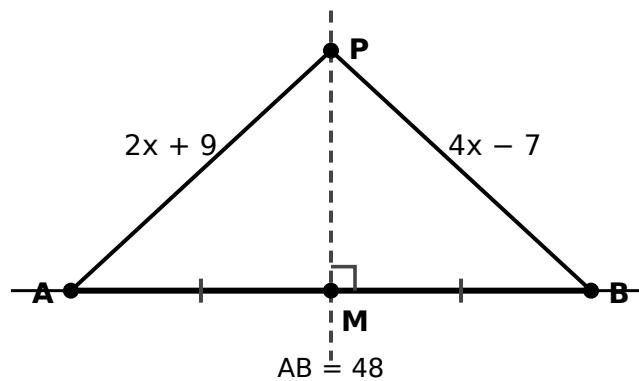


Figure for Question 7.

- Find x . (1 point)
- Find PA . (1 point)
- Find the distance from P to the midpoint of AB . (1 point)

Question 8 Crossing bike lanes (2 points)

Two bike lanes run parallel. A crosswalk crosses both. On the first lane, the angle between the crosswalk and the lane is 38° on the east side. Find the matching angle on the second lane and the same-side interior angle that is its neighbor.