

Parallel Lines Cut by a Transversal

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

Each solution shows the angle relationship, the equation and the scoring split. Where a reason is required, name the theorem or definition used rather than describing the picture.

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

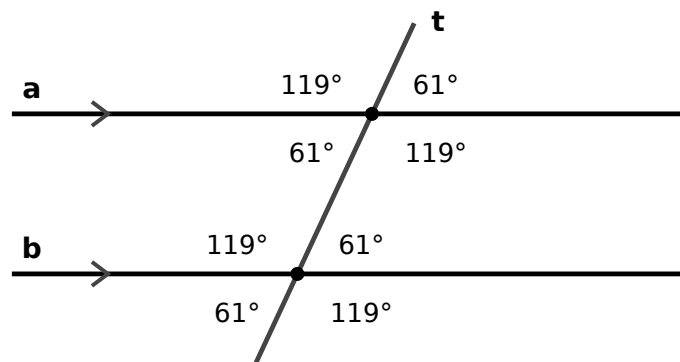
Question 1 Name the pairs (2 points)

- Alternate interior angles.
- Alternate exterior angles.

(a) alternate interior, (b) alternate exterior

Scoring: 1 point per correct name.

Question 2 Find three angles (3 points)



Solved figure for Question 2.

- $\angle 2$ and $\angle 6$ are corresponding: 61° .
- $\angle 4$ and $\angle 2$ form a linear pair: $180^\circ - 61^\circ = 119^\circ$.
- $\angle 7$ is vertical to $\angle 6$, so it equals 61° .

(a) 61° , (b) 119° , (c) 61°

Scoring: 1 point per angle.

Question 3 Alternate interior equation (2 points)

Alternate interior angles are equal: $4x + 11 = 6x - 19$, so $30 = 2x$ and $x = 15$. Each angle is $4(15) + 11 = 71^\circ$, and $6(15) - 19 = 71^\circ$.

$x = 15; 71^\circ$

Scoring: 1 point for x , 1 point for the measure.

Question 4 Decide if lines are parallel (3 points)

- a. Parallel: congruent corresponding angles.
- b. Not parallel: $64^\circ \neq 66^\circ$, so the alternate interior angles are not congruent.
- c. Parallel: $105^\circ + 75^\circ = 180^\circ$, so the same-side interior angles are supplementary.

(a) parallel, (b) not parallel, (c) parallel

Scoring: 1 point per part (answer and reason).

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

The angles must be supplementary: $7x + 4 + 5x + 20 = 180$, so $12x + 24 = 180$ and $x = 13$.
The angles are $7(13) + 4 = 95^\circ$ and $5(13) + 20 = 85^\circ$.

$x = 13; 95^\circ$ and 85°

Scoring: 1 point for x , 1 point for both angles.

Question 6 Prove lines parallel (3 points)

Statement	Reason
1. $\angle 2 \cong \angle 7$	Given
2. $\angle 7 \cong \angle 6$	Vertical angles are congruent
3. $\angle 2 \cong \angle 6$	Transitive Property of congruence
4. $a \parallel b$	Converse of the Corresponding Angles Theorem

Scoring: 1 point for statements 2 and 3 with reasons, 1 point for the conclusion, 1 point for correct order.

Question 7 Equidistant point (3 points)

- a. $2x + 9 = 4x - 7$, so $16 = 2x$ and $x = 8$.
- b. $PA = 2(8) + 9 = 25$.
- c. The midpoint is 24 from each end and the bisector is perpendicular to AB , so the distance is $\sqrt{25^2 - 24^2} = \sqrt{49} = 7$.

$x = 8; PA = 25$; distance 7

Scoring: 1 point per part.

Question 8 Crossing bike lanes (2 points)

The matching (corresponding) angle on the second lane is also 38° . An angle on the same side between the lanes is supplementary to 38° , so it measures $180^\circ - 38^\circ = 142^\circ$.

38° and 142°

Scoring: 1 point for each angle with a valid reason.