

Transformations

Short-answer problems about transformations.

Question 1 Use adjacent angles to prove that vertical angles are equal.

Question 2 Now use rotations to prove that vertical angles are equal.

Question 3 Prove that alternate interior angles and corresponding angles of a transversal with respect to a pair of parallel lines are equal.

Question 4 Prove that the sum of the interior angles of a triangle is 180° .

Question 5 Prove: If a pair of alternate interior angles or a pair of corresponding angles of a transversal with respect to two lines are equal, then the lines are parallel.

Free Response: **Hint:**

Question 6 Prove: If two parallel lines are cut by a transversal, then alternate interior angles are congruent.

Free Response: **Hint:** Let the two parallel lines be ℓ and k . And let P and Q be the intersections between the transversal and ℓ and k , respectively. Let M be the midpoint of \overline{PQ} . Rotate ℓ and the transversal 180° about M . $R(Q) = P$. We proved previously that such a rotation will map ℓ onto a parallel line. That line contains P . And because the parallel to k through P is unique, $R(k) = \ell$.