1. Keeping the first four axioms of Euclidean geometry on the plane, consider replacing the fifth axiom (or equivalently, the Playfair Postulate, otherwise known as the Parallel Postulate) by the following axiom:

\((N)\) Given a line \(\ell_1\) and a point \(P\) not on the line, there are at least two lines \(\ell_2\) and \(\ell_3\) that pass through \(P\) and are parallel to \(\ell_1\).

As usual, two lines are parallel if they do not intersect no matter how long they are extended in both directions.

1 A. Convince yourselves that the new axiom invalidates Euclid's fifth axiom. Namely, assuming (\(N\)), the following situation is possible.

\((V)\) A straight line falling on two straight lines makes the interior angles on the same side less than two right angles, yet the two straight lines, if produced indefinitely, do not meet on that side.

Hint.: Explain why we take it that \(\theta_1 + \theta_2 = 180^\circ\), and \(\theta_1 + \theta_3 < 180^\circ\). Consider the lines \(\ell_1\) and \(\ell_3\).

1 B. In your opinion, is the sum of the three interior angles of every triangle in this 'new geometry' still equal to two right angles? Justify your answers.

Hint.: Think about “closing” up the ‘open triangle’ in (\(V\)). You may make use of the known fact that in an isosceles triangle (two sides of the triangle have equal length), the angles at the base are equal to one another.