

Theorems of Euclidean Geometry That We Will Use

1.5: In isosceles triangles the angles at the base equal one another, and, if the equal straight lines are produced further, then the angles under the base equal one another.

1.15: If two straight lines cut one another, then they make the vertical angles equal to one another.

1.16: In any triangle, if one of the sides is produced, then the exterior angle is greater than either of the interior and opposite angles.

1.19: In any triangle the side opposite the greater angle is greater.

1.29: A straight line falling on parallel straight lines makes the alternate angles equal to one another, the exterior angle equal to the interior and opposite angle, and the sum of the interior angles on the same side equal to two right angles.

1.32: In any triangle, if one of the sides is produced, then the exterior angle equals the sum of the two interior and opposite angles, and the sum of the three interior angles of the triangle equals two right angles.

1.47: In right-angled triangles the square on the side opposite the right angle equals the sum of the squares on the sides containing the right angle.

3.3: If a straight line passing through the center of a circle bisects a straight line not passing through the center, then it also cuts it at right angles; and if it cuts it at right angles, then it also bisects it.

3.7: If on the diameter of a circle a point is taken which is not the center of the circle, and from the point straight lines fall upon the circle, then that is greatest on which passes through the center, the remainder of the same diameter is least, and of the rest the nearer to the straight line through the center is always greater than the more remote; and only two equal straight lines fall from the point on the circle, one on each side of the least straight line.

3.16 corollary: From this it is manifest that the straight line drawn at right angles to the diameter of a circle from its end touches the circle.

3.20: In a circle the angle at the center is double the angle at the circumference when the angles have the same circumference as base.

3.26: In equal circles equal angles stand on equal circumferences whether they stand at the centers or at the circumferences.

3.31: In a circle the angle in the semicircle is right, that in a greater segment less than a right angle, and that in a less segment greater than a right angle; further the angle of the greater segment is greater than a right angle, and the angle of the less segment is less than a right angle.

6.4: In equiangular triangles the sides about the equal angles are proportional where the corresponding sides are opposite the equal angles.

6.5: If two triangles have their sides proportional, then the triangles are equiangular with the equal angles opposite the corresponding sides.