Geometry
Definitions and Theorems

Luke Collins

`maths.com.mt/notes`
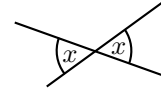
October 23, 2016

1   Definitions

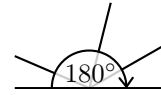1. A **degree** is a unit of angular measure, where one degree ($1°$) represents $\frac{1}{360}$th of a revolution.

   - An **acute** angle is $< 90°$
   - A **right** angle is $= 90°$
   - An **obtuse** angle is $> 90°$ and $< 180°$
   - A **reflex** angle is $> 180°$

2. A set of lines are **parallel** if they have the same direction and do not intersect.

3. A line intersecting parallel lines is called their **traversal**.

4. When a line is extended, we say it is **produced**.

5. A triangle is

   - **right-angled** (or Pythagorean) if one of its angles is $90°$.
   - **scalene** if all its sides are unequal.
   - **isosceles** if two of its sides are equal.
   - **equilateral** if all its sides are equal.

6. Two angles are **complementary** if they add up to $90°$.

7. Two angles are **supplementary** if they add up to $180°$.

8. An angle at a point within a circle is said to be an **inscribed angle**.

9. A **tangent** to a curve is a line which touches the curve at only one point.

10. A **cyclic quadrilateral** (or cyclic quad) is a quadrilateral such that there exists a circle through all of its vertices.
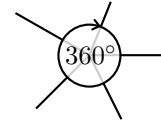
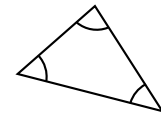# 2 Theorems

1. **Vertically opposite** angles are equal.
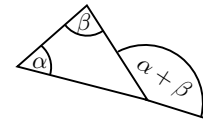
2. Angles **on a straight line** are supplementary.
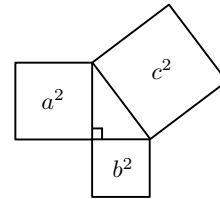
3. Angles **at a point** add up to 360°.

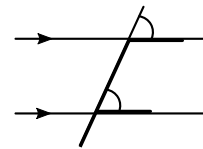4. The three **angles in a triangle** add up to 180°.

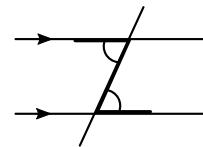5. The exterior angle of a triangle is equal to the **sum of the interior angles** at the other two sides.

6. In a right-angled triangle, the square at the hypotenuse is equal to the sum of the square at the other two sides. (**Pythagoras' Theorem**)
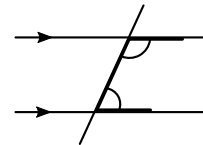
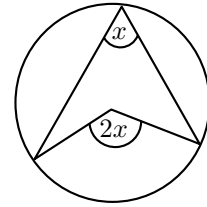7. **Corresponding angles** are equal.
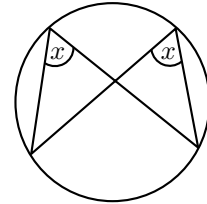
8. **Alternate angles** are equal.
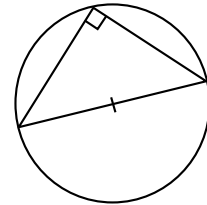
9. **Interior angles** are supplementary.

10. The **angle at the centre** is twice the angle inscribed at the circumference.
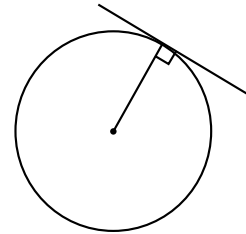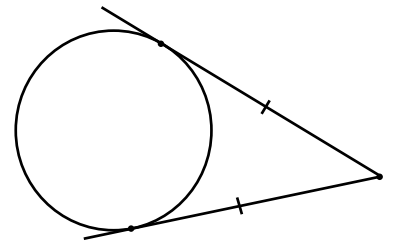
11. Angles **subtended by the same arc** are equal.

12. The angle inscribed by a **semicircle** is a right-angle.
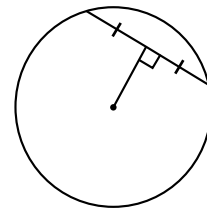
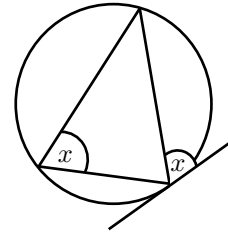13. A tangent to a circle always forms a right angle **with the radius**.

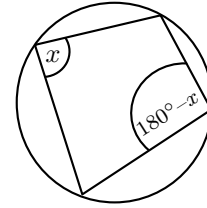14. Tangents to a circle **from the same point** are equal in length.

15. A perpendicular line from the centre of the circle to a chord in the circle **bisects** the chord.

16. The angle between a tangent and a chord is equal to to the opposite angle inscribed by the chord.
(**Alternate Segment Theorem**)

17. **Opposite angles** inscribed in a cyclic quadrilateral are supplementary.

18. Any **exterior angle** of a cyclic quadrilateral is equal to the opposite interior angle.