

O-Level Geometry

Definitions and Theorems

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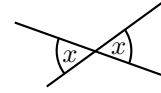
OCTOBER MMXVI

1 Definitions

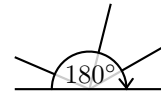
1. A **degree** is a unit of angular measure, where one degree (1°) represents $\frac{1}{360}$ th of a revolution.
 - An **acute** angle is $< 90^\circ$
 - A **right** angle is $= 90^\circ$
 - An **obtuse** angle is $> 90^\circ$ and $< 180^\circ$
 - A **reflex** angle is $> 180^\circ$
2. A set of lines 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

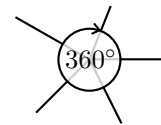
1. **Vertically opposite** angles are equal.



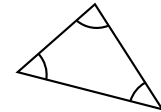
2. Angles **on a straight line** are supplementary.



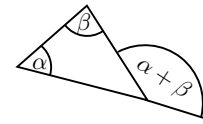
3. Angles **at a point** add up to 360° .



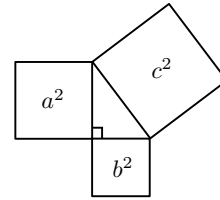
4. The three **angles in a triangle** add up to 180° .



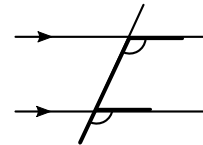
5. The exterior angle of a triangle is equal to the **sum of the interior angles** at the other two sides.



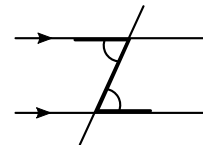
6. In a right-angled triangle, the square at the hypotenuse is equal to the sum of the square at the other two sides. (**Pythagoras' Theorem**)



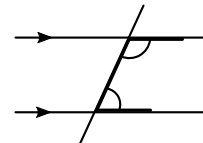
7. **Corresponding angles** (“F angles”) are equal.



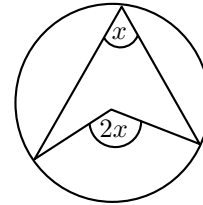
8. **Alternate angles** (“Z angles”) are equal.



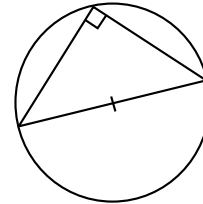
9. **Interior angles** (“C angles”) are supplementary.



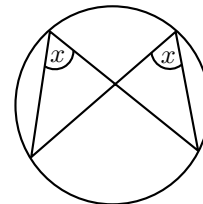
10. The **angle at the centre** is twice the angle inscribed at the circumference.



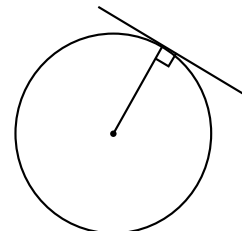
11. The angle inscribed by a **semicircle** is a right-angle.



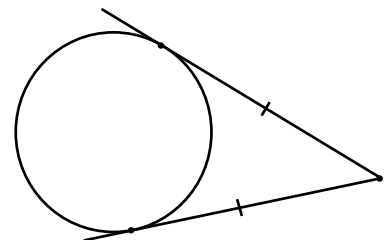
12. Angles **subtended by the same arc** are equal.



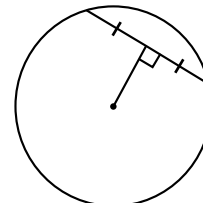
13. A tangent to a circle always forms a right angle **with the radius**.



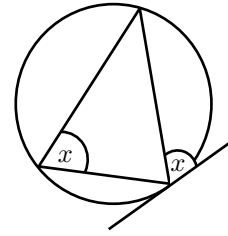
14. Tangents to a circle **from the same point** are equal in length.



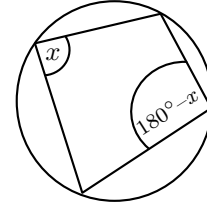
15. A perpendicular line from the centre of the circle to a chord in the circle **bisects** the chord.



16. The angle between a tangent and a chord is equal to 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.

