

## UNIT 3 *Angle Geometry*

## Overhead Slides

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### **Overhead Slides**

- 3.1 Triangles
- 3.2 Special Quadrilaterals
- 3.3 Angles and Parallel Lines
- 3.4 Geometrical Properties of Circles
- 3.5 Tangent-Circle Properties
- 3.6 3-D Shapes
- 3.7 Compass Direction and Bearings

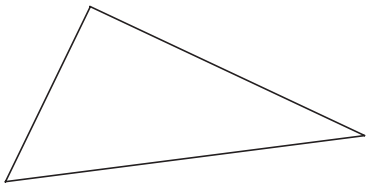
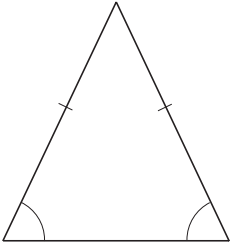
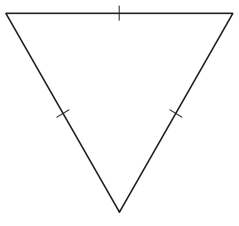
## OS 3.1

*Triangles*

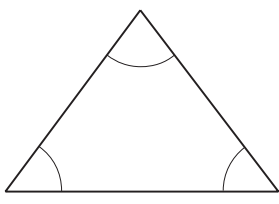
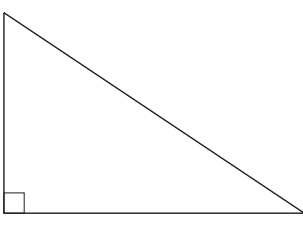
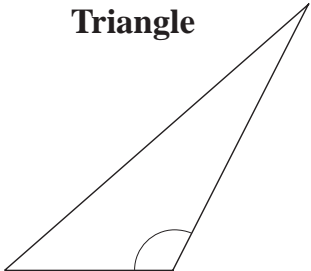
A *triangle* is a polygon with 3 sides.

Triangles can be classified according to:

(a) length of sides

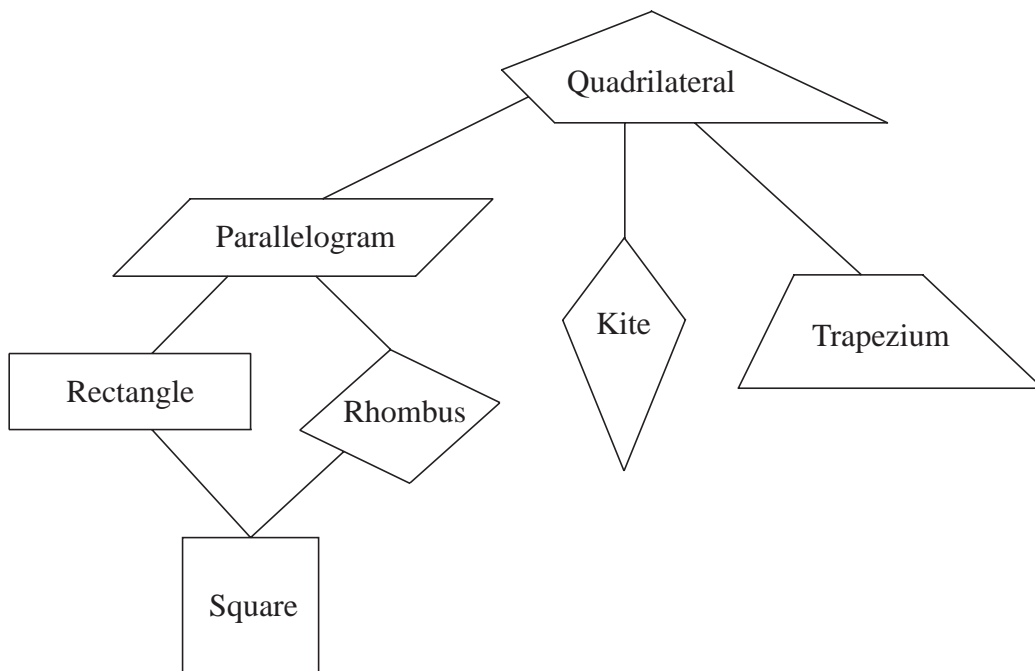
<p><b>Scalene Triangle</b></p>  <p><b>No</b> sides are of equal length.</p>	<p><b>Isosceles Triangle</b></p>  <p><b>Two</b> sides are of equal length.</p>	<p><b>Equilateral Triangle</b></p>  <p><b>All</b> sides are of equal length.</p>
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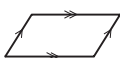
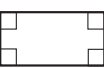
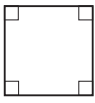

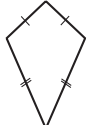

(b) size of angles

<p><b>Acute-angled Triangle</b></p>  <p><b>All</b> angles are <i>acute</i> angles (less than <math>90^\circ</math>)</p>	<p><b>Right-angled Triangle</b></p>  <p><b>One</b> angle is a <i>right</i> angle (<math>90^\circ</math>)</p>	<p><b>Obtuse-angled Triangle</b></p>  <p><b>One</b> angle is an <i>obtuse</i> angle (greater than <math>90^\circ</math>)</p>
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# OS 3.2

## Special Quadrilaterals



Quadrilateral	Sides	Angles	Diagonals
<i>Parallelogram</i> 			
<i>Rectangle</i> 			
<i>Square</i> 			
<i>Rhombus</i> 			
<i>Kite</i> 			
<i>Trapezium</i> 			

## OS 3.2

*Special Quadrilaterals*

Both pairs of opposite sides are equal and parallel

Both pairs of opposite angles are equal.

Diagonals bisect each other.

Both pairs of opposite sides are equal and parallel.

All 4 angles are right angles.

Diagonals bisect each other and are equal.

All 4 sides equal. Opposite sides are parallel.

All 4 angles are right angles.

Diagonals bisect each other at right angles and are equal.

All 4 sides equal. Opposite sides are parallel.

Both pairs of opposite angles are equal.

Diagonals bisect each other at right angles.

Two pairs of adjacent sides are equal but not all 4 sides are equal.

Only one pair of opposite angles are equal.

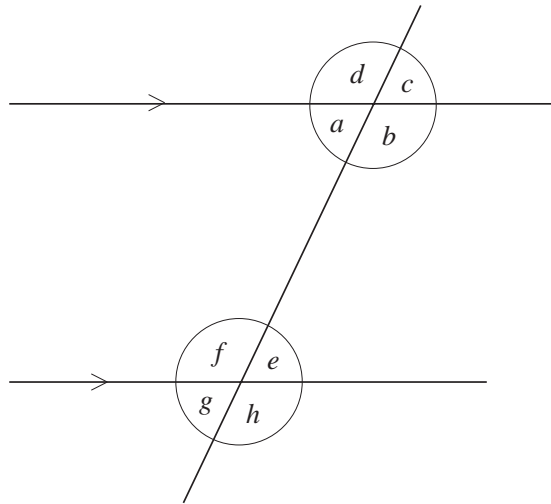
Longer diagonal bisects shorter diagonal at right angles.

One pair of opposite sides are parallel.

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## OS 3.3

*Angles and Parallel Lines***Results**

- *Corresponding* angles are equal.                      e.g.  $d = f$ ,  $c = e$
- *Alternate* angles are equal.                              e.g.  $b = f$ ,  $a = e$
- *Supplementary* angles sum to  $180^\circ$ .              e.g.  $a + f = 180^\circ$

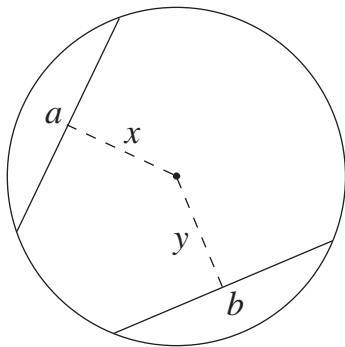
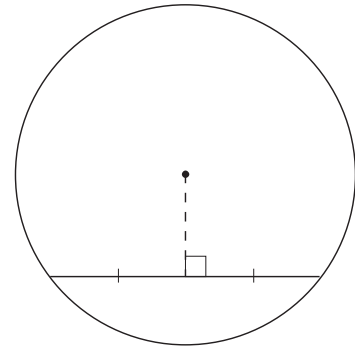
**Thus**

- If *corresponding* angles are equal, then the two lines are parallel.
- If *alternate* angles are equal, then the two lines are parallel.
- If *supplementary* angles sum to  $180^\circ$ , then the two lines are parallel.

# OS 3.4

## Geometrical Properties of Circles

- A straight line drawn from the centre of a circle to bisect a chord is perpendicular to the chord.

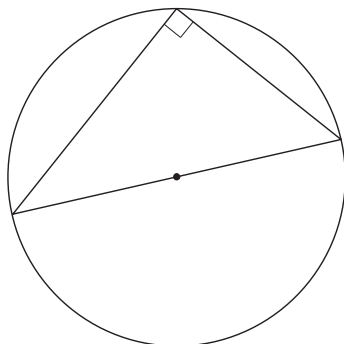
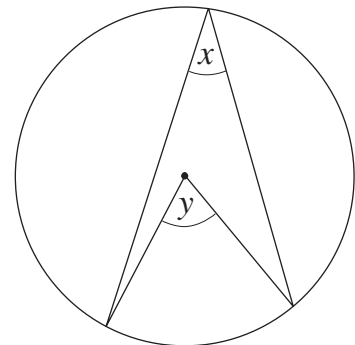


- Equal length chords are equidistant from the centre of the circle.

$x = y$  if  $a = b$

- An angle at the centre of a circle is twice any angle at the circumference subtended by the arc.

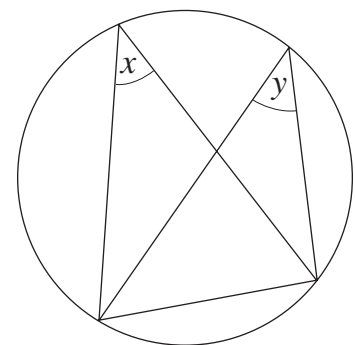
$y = 2x$



- Every angle subtended by the diameter of a semi-circle is a right angle.

- Angles subtended by a chord in the same segment of a circle are equal.

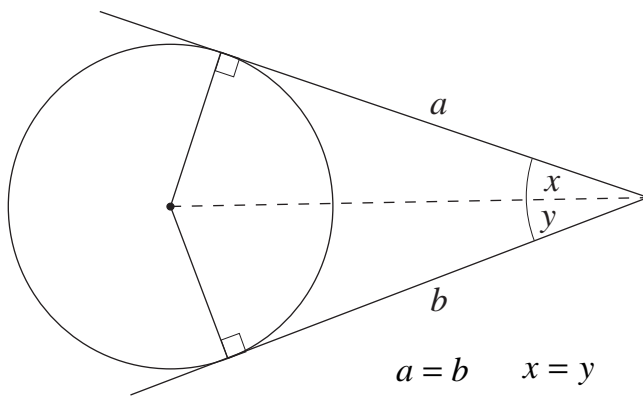
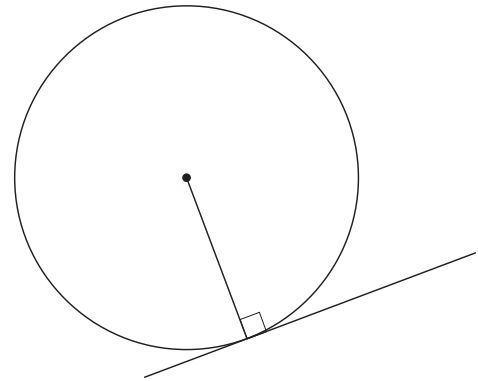
$x = y$



# OS 3.5

## Tangent-Circle Properties

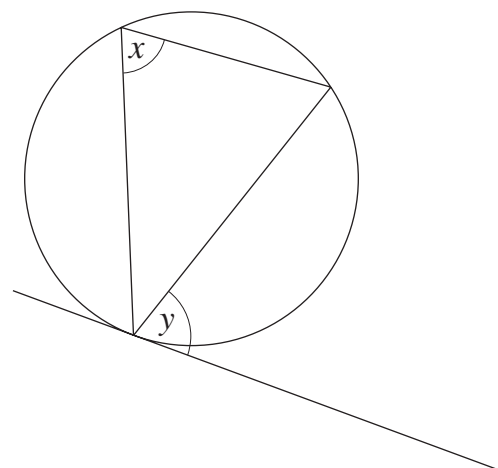
- A tangent to a circle is perpendicular to the radius drawn to the point of contact.



- Tangents drawn to a circle from an external point are equal. The line joining the point to the centre of the circle bisects the angle between the tangents.

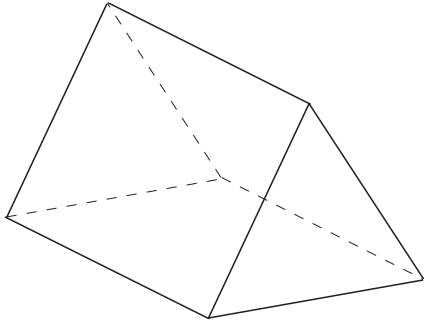
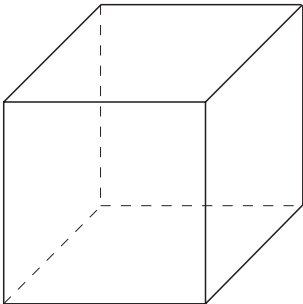
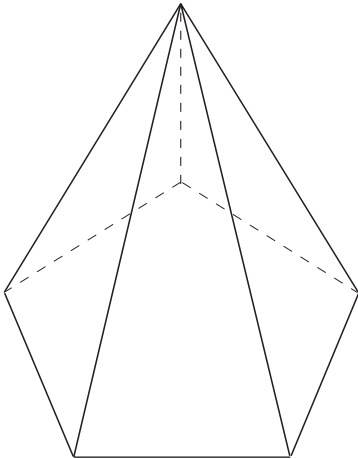
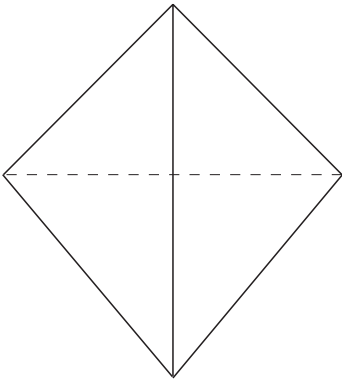
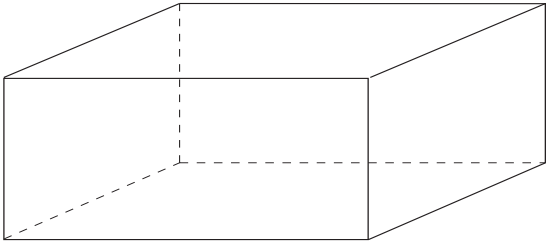
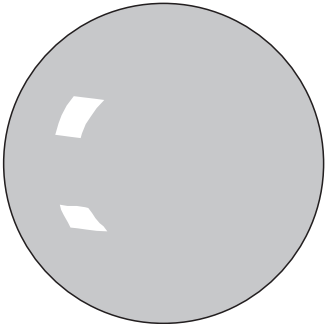
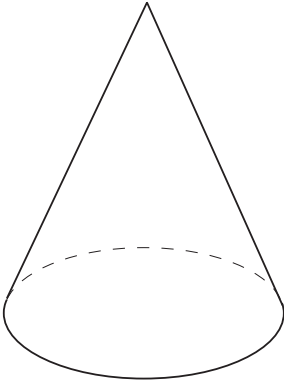
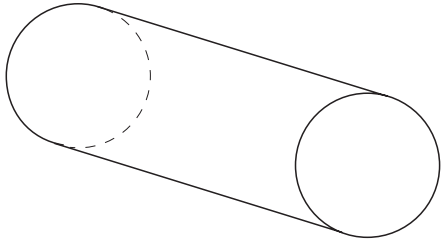
- The angle between a tangent and a chord through the point of contact is equal to the angle in the alternate segment.

$x = y$



# OS 3.6

# 3-D Shapes





# OS 3.7

## Compass Direction and Bearings

