# Classic configurations	Season	1
	Episode	AP03
	Time frame	1 period

Prerequisites : Configurations and theorems seen during previous years.

Objectives :
- Review the main configurations and theorems of the previous years.
- Use these configurations to solve two problems.

Materials :
- *Answer sheets with three configurations on each.*
- *Problems.*

1 – Scrambled groups - part 1 — 15 mins

Students are working in 4 groups of 4 or 5. Each group is given an answer sheet with three classic configurations. They have to find the name and precise description of the situation or concept illustrated.

2 – Scrambled groups - part 2 — Remaining time

Groups are scrambled, so that in each new group there is one member of each of the four original groups. They have to cooperate to solve a problem, where the configurations they've reviewed may (or may not) be useful.

Classic configurations	Season	1
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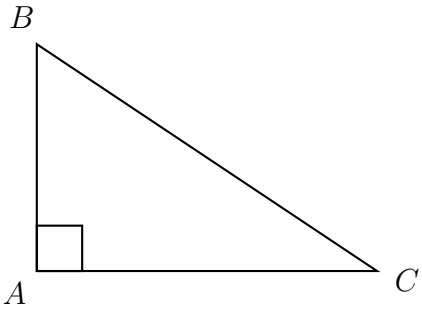
	Document	Answer sheet 1



Name : . . . . . .

Property : . . . . . .

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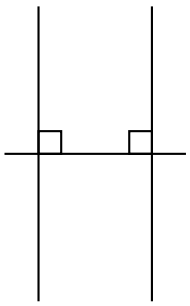

Name : . . . . . .

Property : . . . . . .

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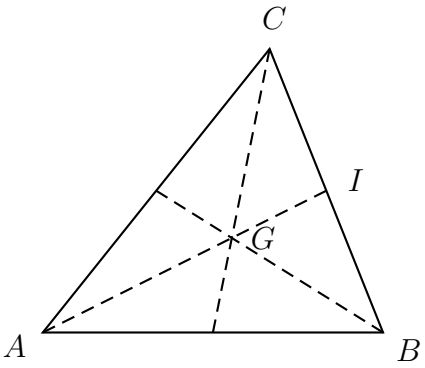

Name : . . . . . .

Property : . . . . . .

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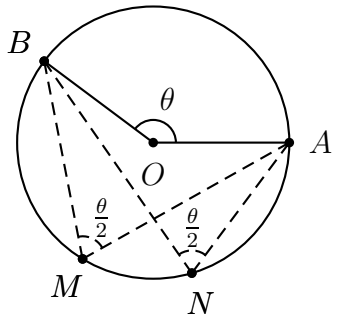
Classic configurations	Season Episode Document	1 AP03 Answer sheet 2



Name : . . . . . .

Property : . . . . . .

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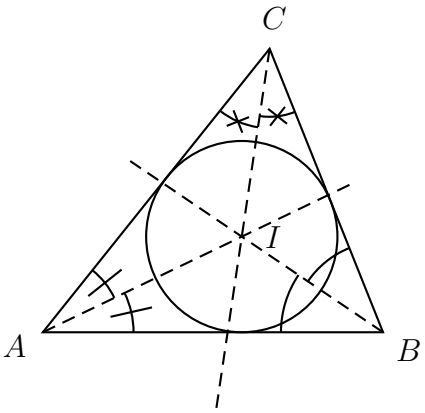

Name : . . . . . .

Property : . . . . . .

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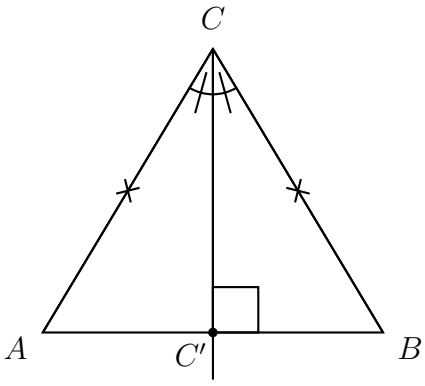

Name : . . . . . .

Property : . . . . . .

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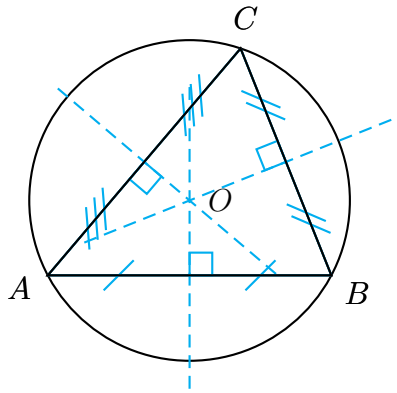
Classic configurations	Season Episode Document	1 AP03 Answer sheet 3



Name : . . . . . .

Property : . . . . . .

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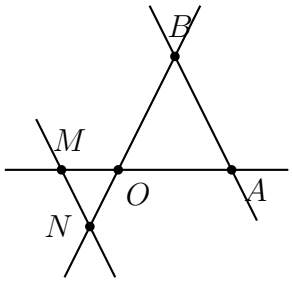

Name : . . . . . .

Property : . . . . . .

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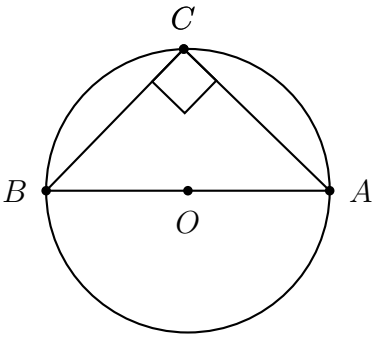

Name : . . . . . .

Property : . . . . . .

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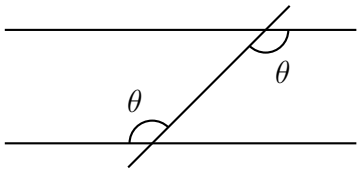
Classic configurations	Season Episode Document	1 AP03 Answer sheet 4



Name : . . . . . .

Property : . . . . . .

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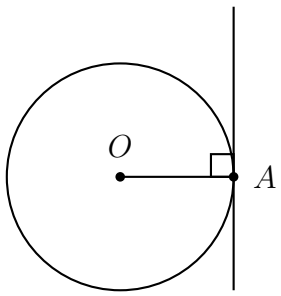

Name : . . . . . .

Property : . . . . . .

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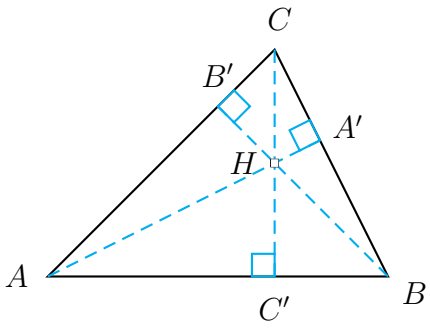

Name : . . . . . .

Property : . . . . . .

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Classic configurations	Season Episode Document	1 AP03 Problems

Any configuration used in these problems must be explicitely stated. It will also be useful to draw every geometrical object mentioned in the questions, with different colors.

Problem 1

Let ABC be a scalene triangle such that AB is greater than AC and $\mathscr{C}$ the circle of centre A and radius AC. The line AB intersects the circle in D and E, with D on the segment AB. The line $\mathscr{D}$ is parallel to CE and passes through A. The aim of this exercise is to prove that $\mathscr{D}$ is the angular bisector of the angle $\angle BAC$.

1. Draw a precise figure.
2. Use a classic configuration to find out what kind of triangle DCE is.
3. What can you say about the lines $\mathscr{D}$, DC and CE.
4. What can you deduce about the line $\mathscr{D}$ in the triangle ADC ?
5. Find out what kind of triangle ADC is.
6. Conclude.

Problem 2

Consider a circle $\mathscr{C}$ of centre O and two points A and B on the circle, such that AB is not a diameter of the circle and AOB is not right-angled. The tangets to the circle through the points A and B meet in C. Now, the lines AC and BO meet in D and the lines BC and AO meet in E.
Prove that the lines DE and CO are perpendicular.

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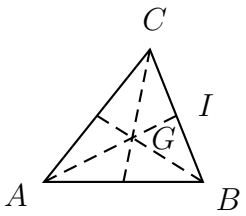
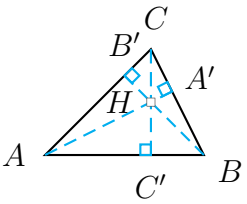
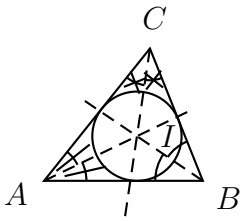


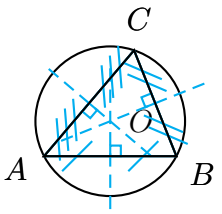
Name : Medians and the center of gravity
Property : The three medians of a triangle meet at the center of gravity.



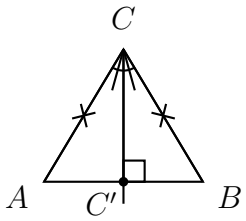
Name : Altitudes and orthocenter
Property : The three altitudes of a triangle meet at the orthocenter of that circle.



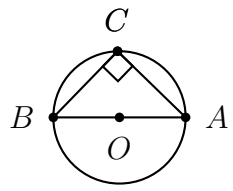
Name : Angular bisectors and the center of the inside circle
Property : The intersection of the three angular bisectors of a triangle is the center of the inside circle.



Name : Perpendicular bisectors and the circumcenter
Property : The intersection of the three perpendicular bisectors of a triangle is the center of the circumcircle (also called the circumcenter).



Name : Isosceles triangle
Property : In an isosceles triangle, the median, the altitude, the angular bisector and the perpendicular bisector from the main vertex are the same.



Name : Thales' theorem
Property : if A, B and C are points on a circle such that AC is a diameter, then the angle $\angle ABC$ is a right angle.

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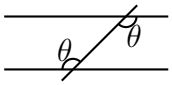
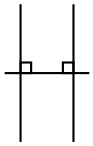
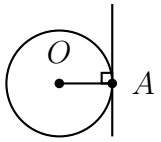


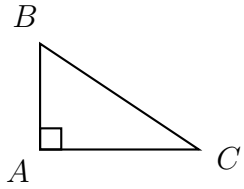
Name : Alternate-internal angles
Property : If one line intersects two parallel lines, then the alternate-internal angles are equal.



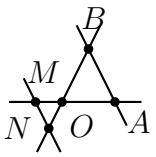
Name : Two lines perpendicular to a third one
Property : If two lines are perpendicular to a third one, then they are parallel to each other.



Name : Tangent to a circle
Property : A line which is perpendicular to a radius and which passes through a point of the circle is a tangent to that circle.

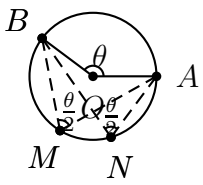


Name : Pythagorean theorem
Property : A triangle ABC is right-angled in A if and only if $BC^2 = AB^2 + AC^2$.



Name : Intercept theorem
Property : Let BN and AM be two lines that meet in O. If the lines AB and MN are parallel and if the points B, O, N are in the same order than A, O, M then

$$\frac{OA}{OM} = \frac{OB}{ON} = \frac{AB}{MN}$$



Name : Inscribed angle
Property : In a circle, an inscribed angle measures half of the central angle.