

Séquence géométrie

Introduction :

Cette séquence nécessite de connaître les principaux termes de géométrie (nom des figures, outils de constructions...). Ces termes pourront être introduits lors des séances précédentes de différentes manières :

- Mix and match de vocabulaire (chaque élève reçoit soit une définition soit le nom d'une figure et il doit retrouver l'élève qui a la partie manquante).
- Texte anglais à trous : les élèves doivent compléter les mots ou les figures manquantes.
- Construction d'une figure avec Geogebra en anglais à partir d'un programme de construction.
- Construction des figures de base à l'aide du site www.mathopenref.com
- Écriture en anglais de théorèmes ou propriétés connus (Pythagore, droite des milieux, cercle inscrit...) puis présentation devant la classe.

Déroulement :

Geometry on the phone.

Par groupes (2, 3 ou 4), les élèves reçoivent 2 figures et doivent se mettre d'accord pour écrire un programme de construction pour chacune d'elles.

Les autres groupes reçoivent des figures différentes.

Quand ils ont fini, un élève d'un groupe lit son programme de construction à un élève d'un autre groupe qui doit dessiner la figure au fur et à mesure. Il est préférable que l'élève qui dicte ne voit pas ce que fait son partenaire pour ne pas l'influencer.

On compare enfin la figure de départ et la figure tracée.

Geometry contest

On fait des groupes de 2 (élève A et élève B). Tous les élèves A sont assis. Les élèves B sont debout, derrière eux avec une figure à la main que les autres ne voient pas. Au signal, les élèves B décrivent en anglais la figure à leur partenaire (élèves A). Le premier groupe à avoir tracé la figure correctement a gagné.

Lieux de points

Construction de lieux de points classiques : médiatrices, bissectrices, cercles... A compléter suivant le niveau des élèves par la construction de paraboles, ellipses et hyperboles.

Donner des régions ou des lieux de points déjà tracés et demander aux élèves de décrire ces lieux de points, de donner les conditions géométriques qui amènent à obtenir de tels lieux de points.

Application : chasse au trésor (exemple et création par les élèves).

Remarques :

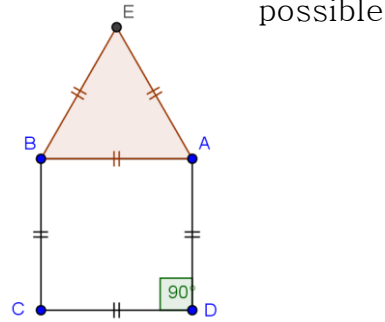
Ces activités ont été testées en 3ème et en seconde.

Geometry on the phone et geometry contest ont permis une bonne prise de parole des élèves et une bonne appropriation du vocabulaire mais écrire un programme de construction précis et clair reste difficile.

Les lieux de points ne sont pas abordés ainsi en 3ème et en seconde dans les programmes officiels des cours en français. C'est l'occasion pour les élèves de se familiariser avec ces notions qu'ils utiliseront ensuite lorsqu'ils créeront leur propre carte au trésor.

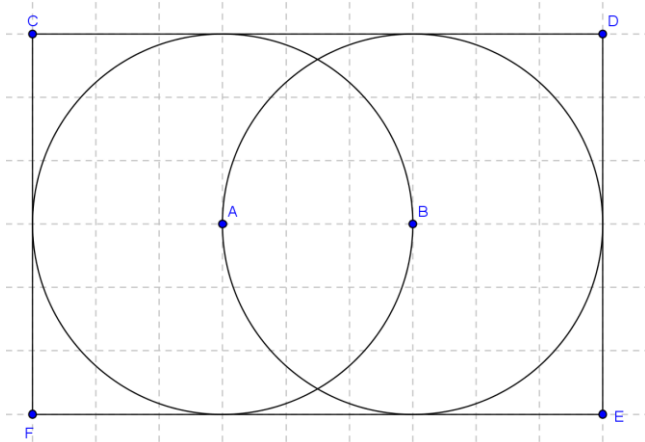
Geometry on the phone

Imagine you're talking on the phone to a friend who needs to construct the drawing below.
 Try to explain him as simply as possible how to do.



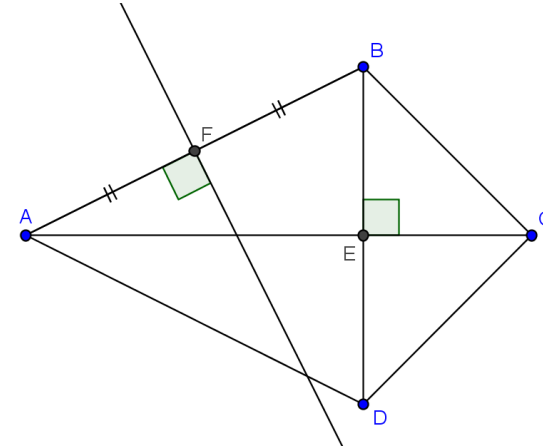
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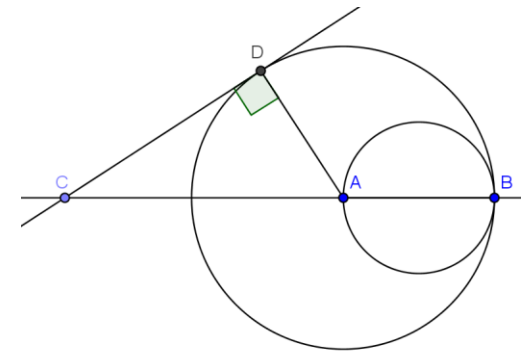
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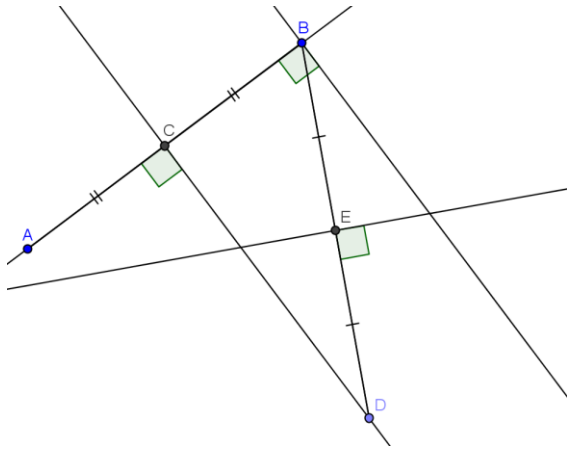
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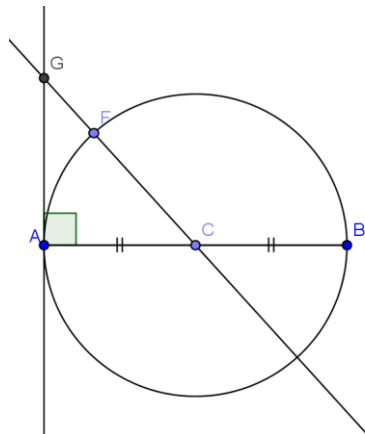
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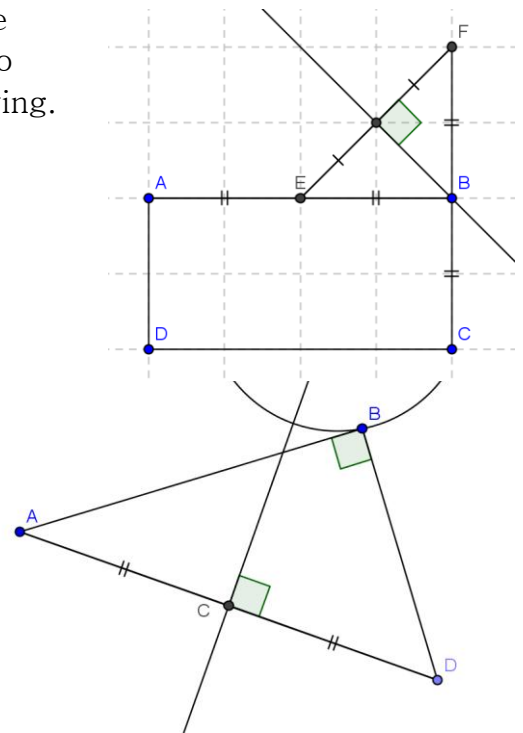


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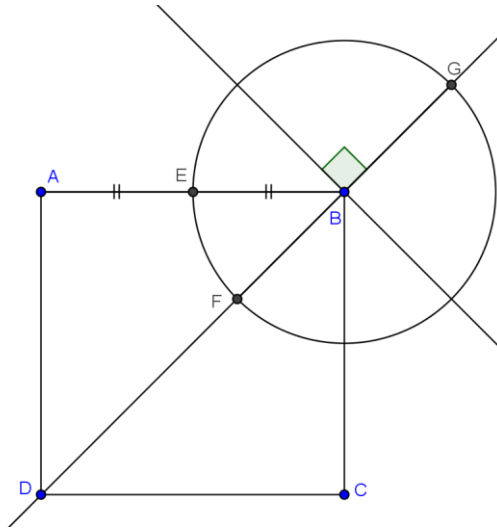
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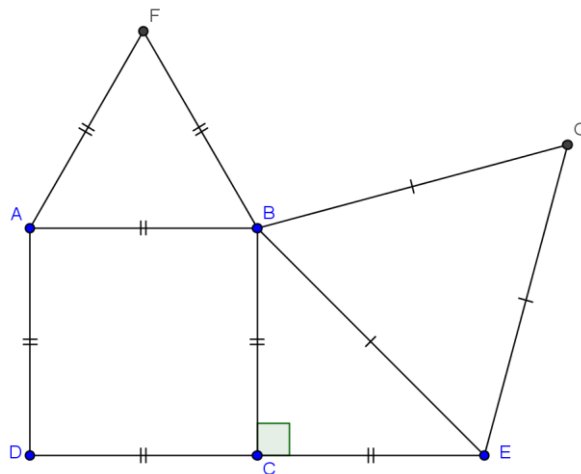


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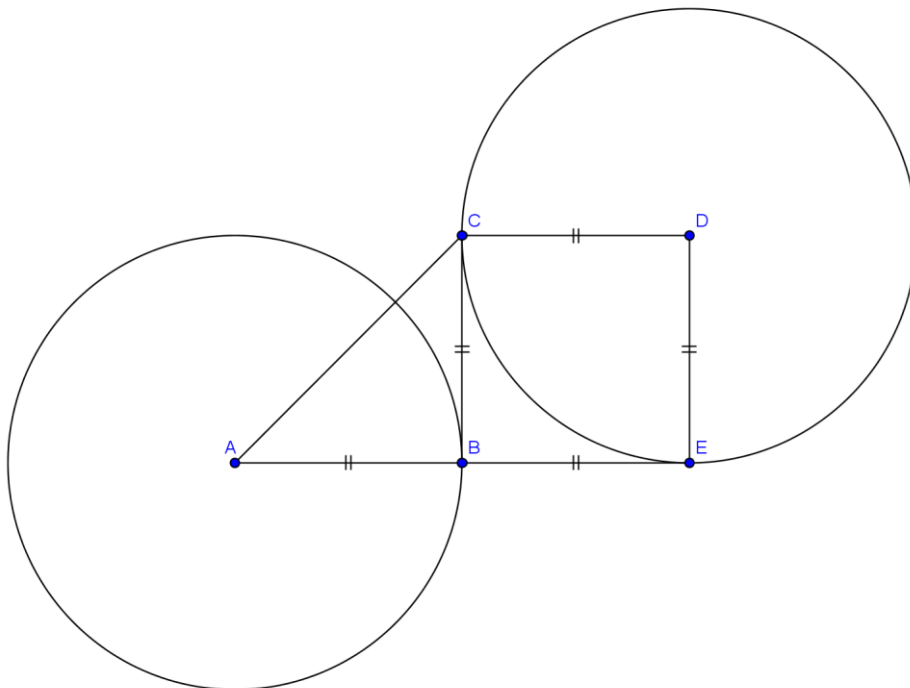
Geometry contest



You have two minutes to make your partner draw this figure without showing it to him !

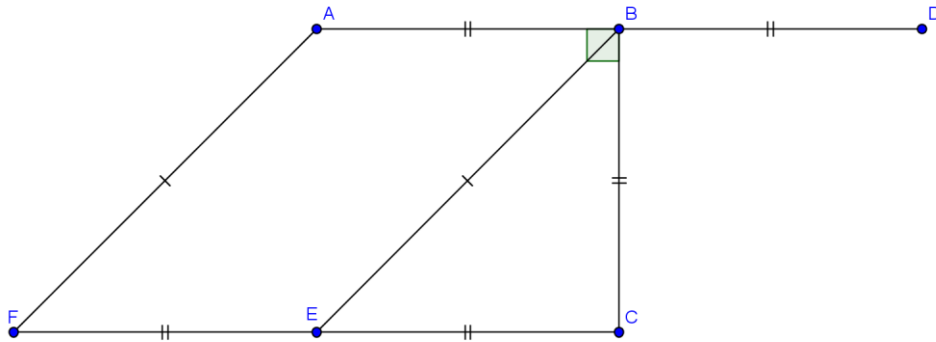
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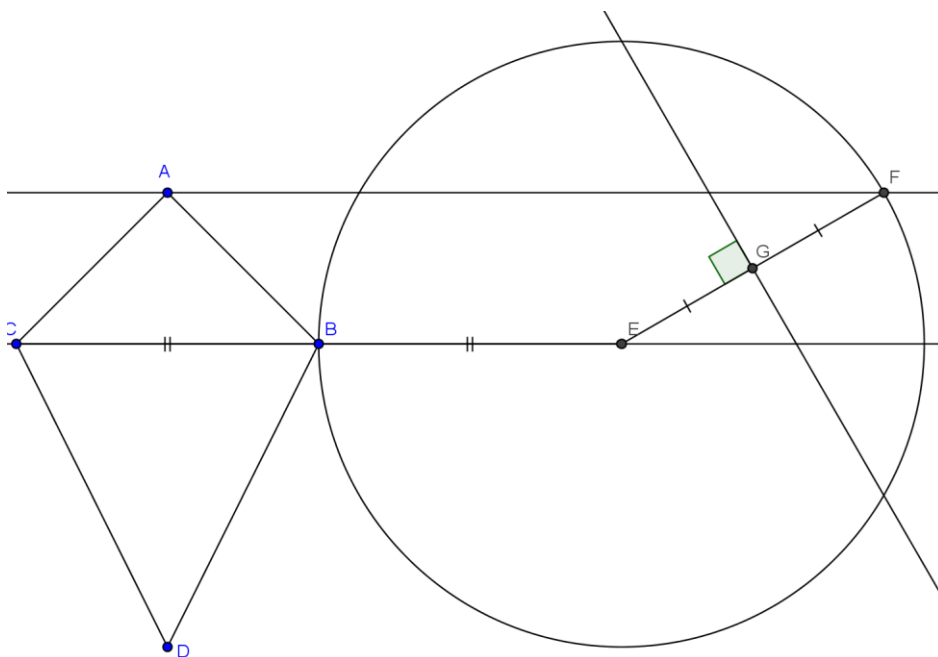
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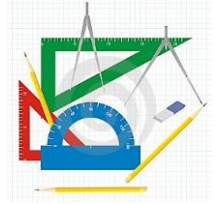


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LOCI AND CONSTRUCTIONS



Definition : A **LOCUS** is a shape created by all the possible positions which fit in a given rule. (the plural of locus is **LOCI**)

Common loci

1) The locus of points which are “a fixed distance from a given point”.

ex : Let P be a point, draw all the points which are 3 cm from P.

P
X

this locus is

2) The locus of points which are “equidistant from two given points”.

ex : Let A and B be two points, draw all the points which are equidistant from A and B.

A
X

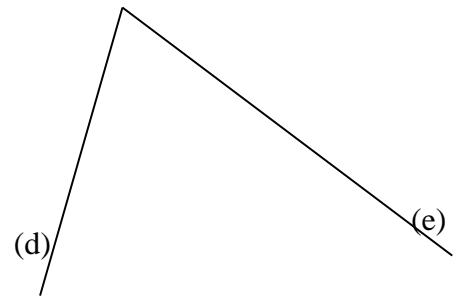
this locus is

B
X

3) The locus of points which are “equidistant from two non-parallel lines”.

ex : Let (d) and (e) be two non parallel lines, draw all the points which are equidistant from (d) and (e).

this locus is

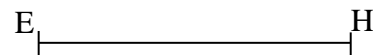


Other Loci

4) The locus of points which are “a fixed distance from a given line”.

ex : Let [EH] be a line segment, draw all the points which are 2 cm from [EH].

this locus is

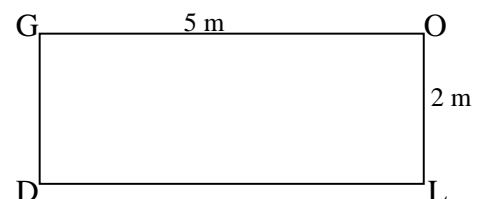


5) A golden coin is buried in the rectangular field GOLD. It is 4 m from L and equidistant from (GD) and (GO).

Mark with an X the position of the gold coin.



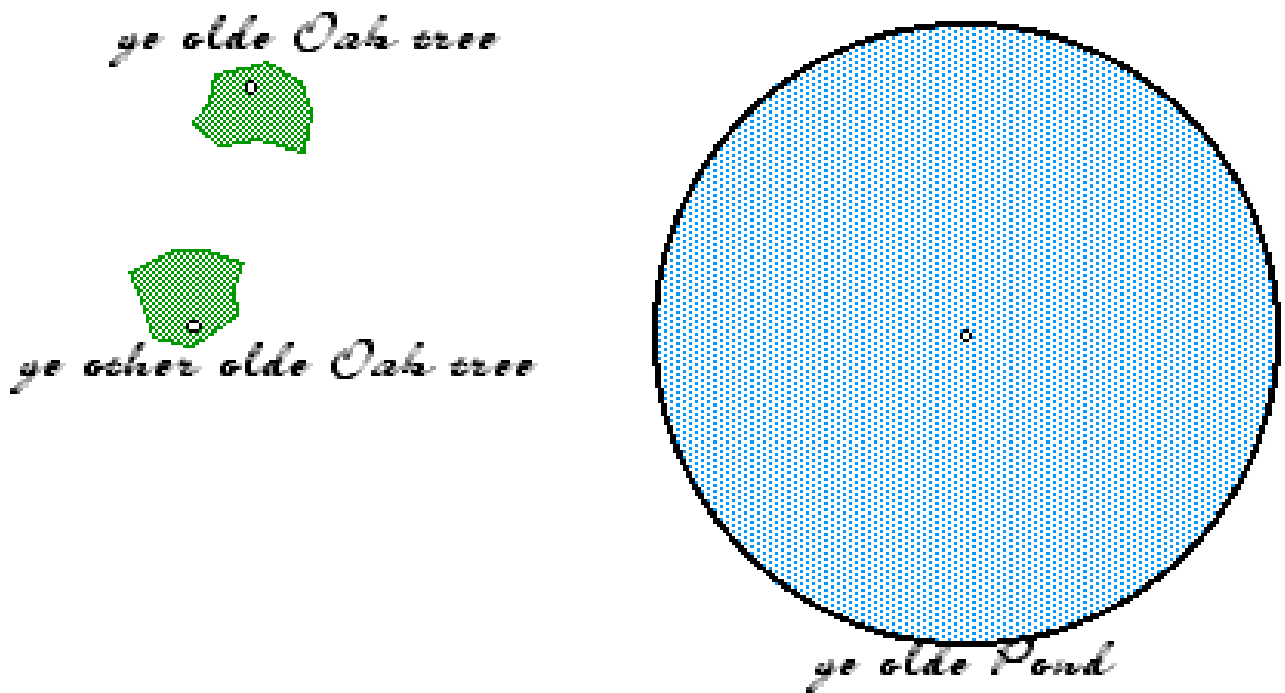
Treasure Map



6) Let's take a look at a treasure map, from the book Treasure Island, by Robert Louis Stevenson.



The treasure is buried equally far from each of ye two olde Oak trees and 3 paces from ye olde Pond.

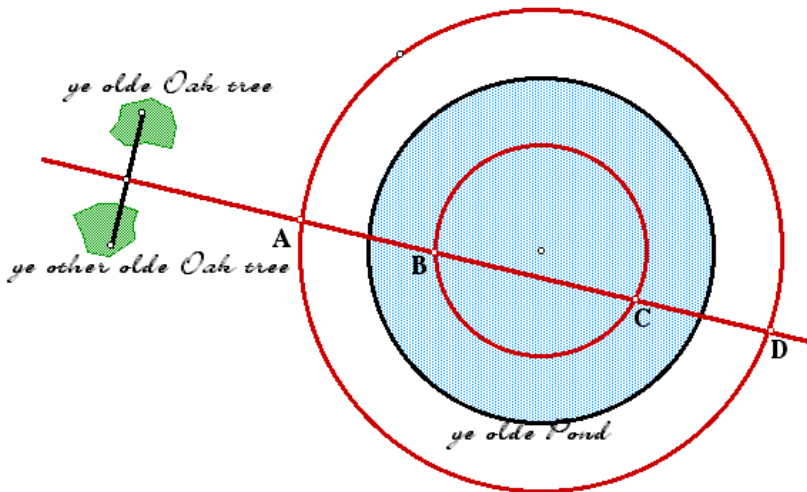


At first reading, this may not seem like a locus problem, but it certainly is !
 If we "translate" the words below into mathematical terminology, they would say "equidistant from two points (represented by Oak Tree 1 and Oak Tree 2) and 3 units from a given circle (represented by the Pond)".
 Find the treasure !

7) Create your own treasure map ! Work by pairs, draw a map and write a message to find where the treasure is hidden.

ANSWER: The locus of points equidistant from 2 points (the 2 Oak trees) is a line, the perpendicular bisector of the segment joining the 2 points. The locus of points a given distance from a circle is 2 circles, concentric with the given circle, one with radius the given distance inside the given circle, and the other with radius the given distance outside the given circle. The compound locus (the point or points that meet both conditions) is 4 points, ABC and D as shown.

The treasure is buried equally far from each of ye two olde Oak trees and 3 paces from ye olde Pond.



<http://www.regentsprep.org/Regents/math/geometry/GL3/LocusCom.htm>

<http://www.mathopenref.com/locus.html>

create a locus treasure map :

<http://mathforum.org/~sanders/creativegeometry/9.1locus.htm>

LOCI (2)

The locus of points which are equidistant from a fixed point and a fixed line.

ex : Let F be a point and (d) be a straight line, draw all the points which are equidistant from F and (d).

F
X

(d)

This locus is The point F is called and the line (d) is called

LOCI (3)

The locus of points for which the sum of the distances from two given points is always the same.

ex : Let E and F be two points, draw all the points which are like M, that's to say : $EM + MF = 16 \text{ cm}$

E
X

F
X

This locus is The points E and F are called

How would a gardener draw it in a garden ?.....

