Figure Properties

1

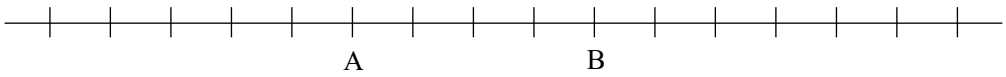
Figure the following points for the line segment AB.

(1) Point P that divides inside into 1 : 3

(2) Point Q that divides outside to 1 : 2

(3) Point R that divides outside to 7 : 3

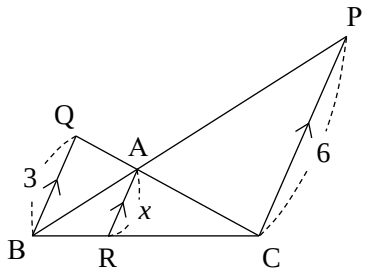
(4) Midpoint M



2

In the figure on the right, find the length x of the line segment.

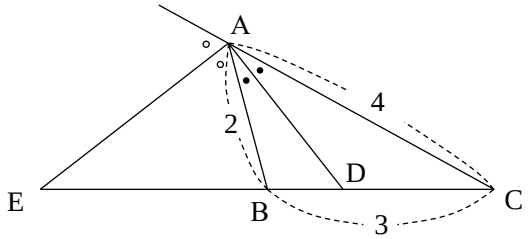
However, AR//BQ, AR//CP, BQ = 3 and CP = 6.



3

In △ABC where AB=2, BC=3, and CA=4, D is the intersection of the bisector of angle A with side BC, and E is the intersection of the bisector of the exterior angle of angle A with the extension of side BC.

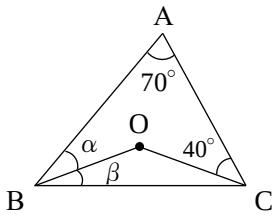
Find the length of line segment DE.



4

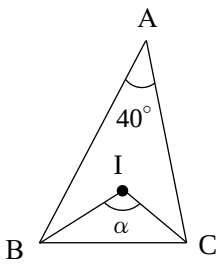
In the figure on the right, point O is the outer center of △ABC.

Find α, β.

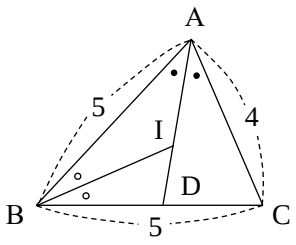


5

(1) In the figure on the right, point I is the interior center of △ABC.
Find α.



(2) In △ABC where AB=5, BC=5, and CA=4,
let I be the interior center and D be the intersection
of line AI and side BC, then find AI : ID.

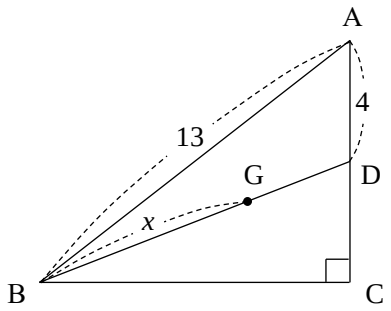


6

In the figure on the right,

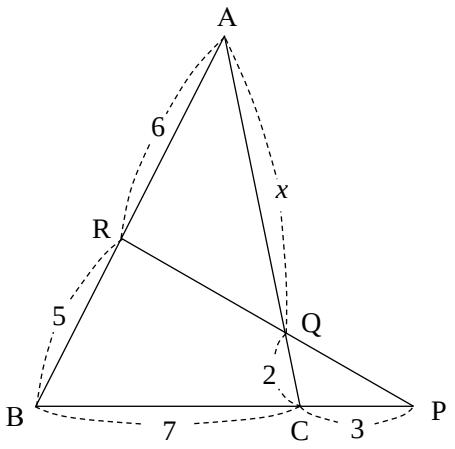
point G is the center of gravity of △ABC and ∠C＝90° .

Find the length x of the line segment.



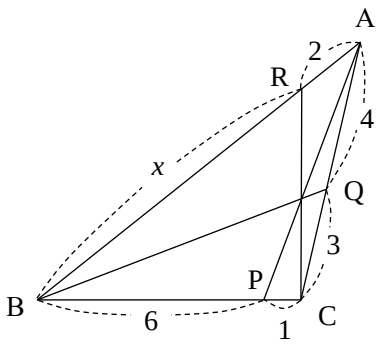
7

In the figure on the right, find the length x of the line segment.



8

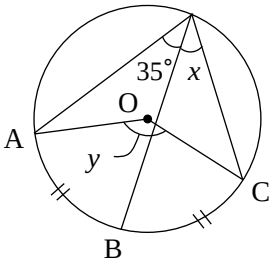
In the figure on the right, find the length x of the line segment.



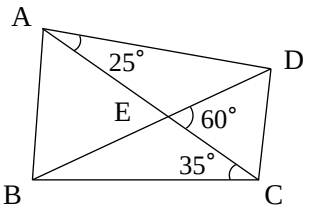
9

(1) In the figure on the right, find x, y.

However, point O is the center of the circle and $\overset{\frown}{AB}=\overset{\frown}{BC}$.

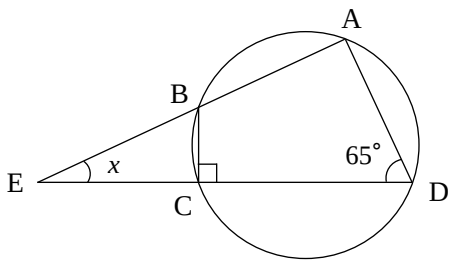


(2) In the figure on the right, are the 4 points A, B, C, and D on the same circumference?



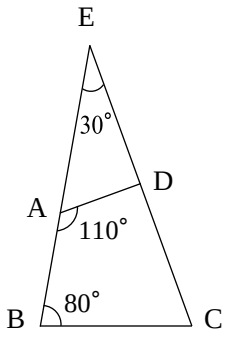
１０

In the figure on the right, find x .



1 1

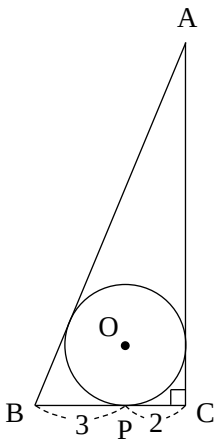
Is the right quadrilateral ABCD inscribed in a circle?



１２

In the figure on the right, circle O is the inscribed circle of right triangle ABC with angle C = 90° and point P is the contact point between side BC and circle O.

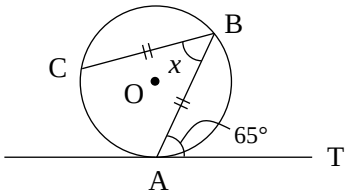
Find the lengths of sides AB and AC when BP＝3 and CP＝2.



１３

In the figure on the right, the line AT is tangent to the circle O at the point A.

Find x.

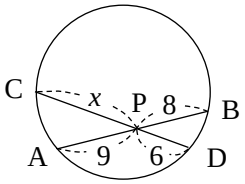


１４

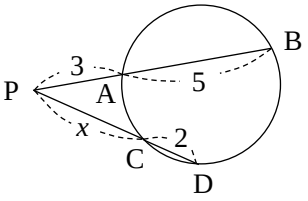
Find the value of x in the following figure.

Note that the line PT in (3) is tangent to the circle whose tangent point is T.

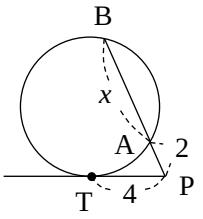
(1)



(2)

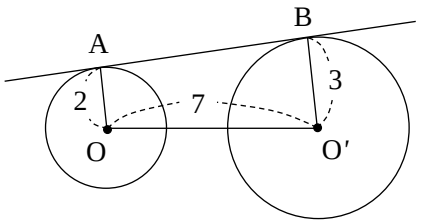


(3)



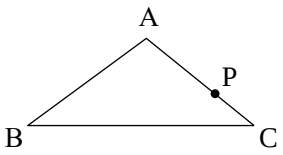
１５

In the figure on the right, straight line AB is the common tangent of the 2 circles O and O′, and points A and B are the points of contact. Find the length of line segment AB.

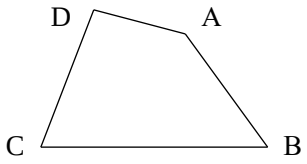


１６

(1) △ABC and a point P on side AC are given.
Draw a line passing through point P and bisecting the area of △ABC.



(2) There is a quadrilateral ABCD as shown in the figure on the right.
Draw a line passing through vertex A and bisecting the area of quadrilateral ABCD.

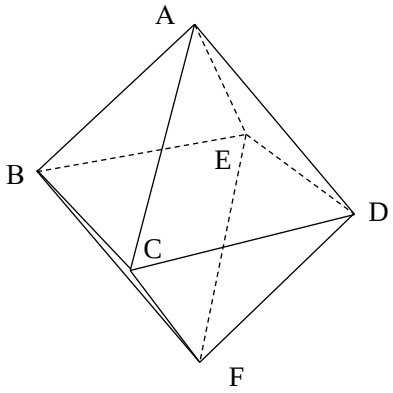


17

Given a line segment of length 1, construct a line segment of length $\sqrt{3}$.

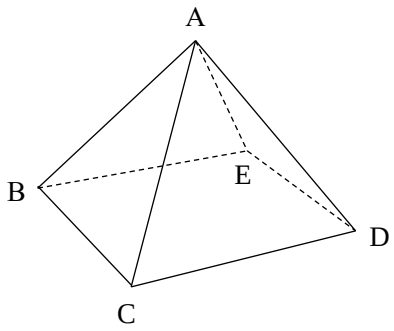
１８

Find the angle between 2 lines AB and EF
in the regular octahedron ABCDEF whose length of one side is 1,
as shown in the figure on the right.



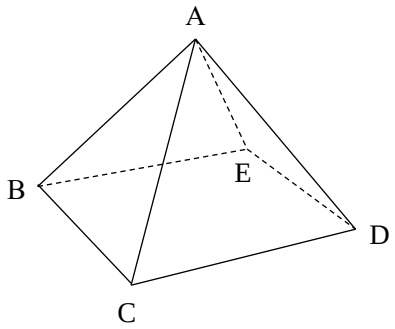
１９

In a regular quadrilateral pyramid A-BCDE with side length 1 as shown in the figure on the right, find the value of $\cos\theta$ when the angle between line AB and plane BCDE is θ.



２０

In a regular quadrilateral pyramid A-BCDE with length 1 on one side,
find the value of $\cos\theta$ if the angle between the planes ABC and BCDE is θ.



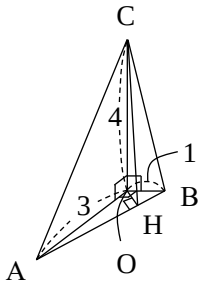
2 1

There are line segments OA, OB, and OC perpendicular to each other,
OA = 3, OB = 1, and OC = 4.
When drawing a perpendicular line OH from point O to line segment AB, answer the following questions.

(1) Find the length of the line segment OH.

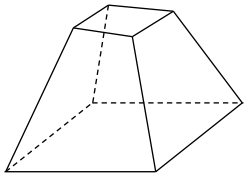
(2) Find the length of the line segment CH.

(3) Find the area of △ABC.



2 2

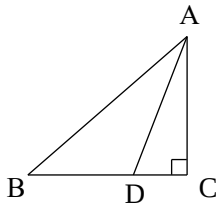
Verify that Euler's polyhedron theorem holds for the polyhedron shown in the figure on the right.



Study

Answer the following questions.

(1) Right triangle ABC with angle C = 90° ,
let D be a point on side BC, prove that
AB＞AD .



(2) Find if there exists a triangle whose 3 sides have the following lengths.

① 3，5，7　　② 1，2，3