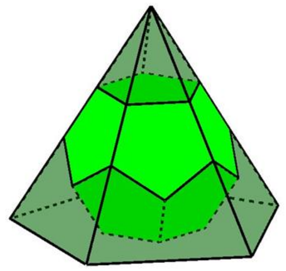
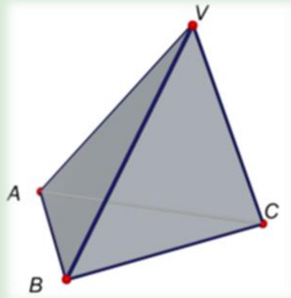
FEBRUARY

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUN.



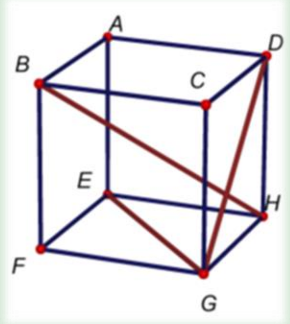
1



2

The base of a tetrahedron is an equilateral triangle, and the three lateral faces unfolded and laid in a plane form a trapezoid with sides 10, 10, 10, and 14 units in length.
Find the sum of the lengths of all the arista of the tetrahedron and also determine their area.
KöMaL C1559.

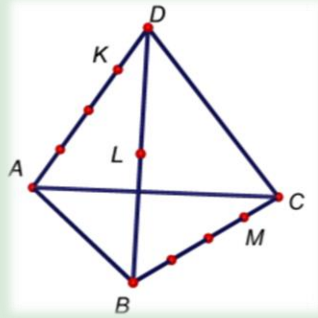
3



4

Let a cube ABCDEFGH, whit edge 1.
Prove that $\overline{BH}$ is perpendicular to $\overline{EG}$.
Prove that $\overline{BH}$ is perpendicular to $\overline{GD}$.
Prove that $\overline{BH}$ is perpendicular to plane EDG.
Calculate the intersection of $\overline{BH}$ and the plane EDG.
Calculate the distance of $\overline{BH}$ the plane EDG

5



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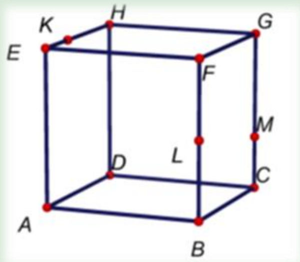
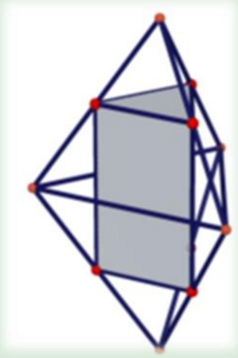
7 e-day



8

Let ABCDEFGH be a cube with edge $\overline{AB} = 1$. Let K of edge $\overline{EH}$ such that $\overline{HK} = 2 \cdot \overline{EK}$. Let L be the midpoint of edge $\overline{BF}$. Let M of the edge $\overline{CG}$ such that $\overline{GM} = 2 \cdot \overline{CM}$. Determine the sides of the section of the cube generated by the plane that passes through points K, L, M.

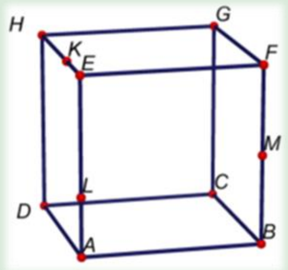
9



10

Let a cube ABCDEFGH of edge $\overline{AB} = 1$.
Let K of the edge $\overline{EH}$ such that $\overline{HK} = 2 \cdot \overline{EK}$
Let L of the edge $\overline{AE}$ such that $\overline{EL} = 2 \cdot \overline{AL}$
Let M the midpoint of the edge $\overline{BF}$.
Determine the perimeter and area of the section of the cube that determines the plane that passes through points K, L, M.

11



12

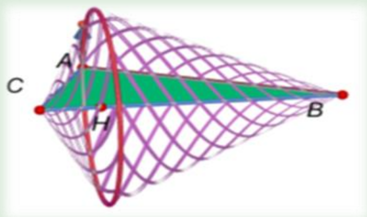
Let the regular tetrahedron ABCD of edge 1. Let K be the point of the edge $\overline{AD}$, such that $\overline{AK} = 3 \cdot \overline{DK}$. Let L be the midpoint of the edge $\overline{BD}$. Let M the point of the edge $\overline{BC}$ such that $\overline{BM} = 3 \cdot \overline{CM}$. Calculate the area of the tetrahedron section determined by the plane that passes through the points K, L, M

13

14

The hypotenuse of a right triangle is 5. Find the legs knowing that the volumes generated by the triangle as it rotates around the legs are one double that of the other. Find the volume of the two cones. Determine the volume of the double cone generated by the triangle when rotating about the hypotenuse

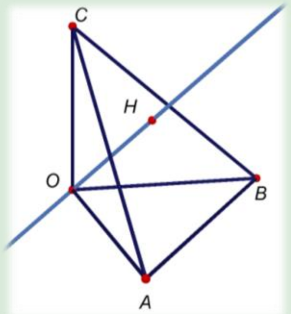
15



16

Two regular tetrahedron are joined by one face.
Determine the ratio between the volume of the vertex prism the midpoints of the edges of the tetrahedron and the sum of the volumes of the two tetrahedrons.

17



18

A sphere of radius r has inscribed a cone that has the vertex at the centre of the sphere and an angle 2α at the vertex.
Determine the area and volume of the part of the sphere that the cone intersects.
Problem proposed by Joan Galiana, student and mathematician

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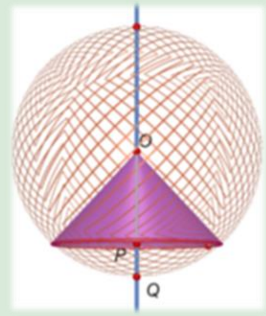

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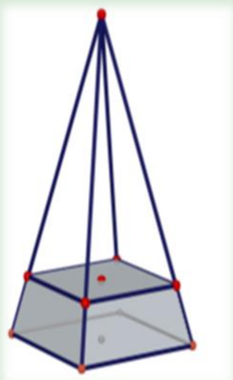

22

Given the regular double tetrahedron, determine the ratio between the volumes of the dual polyhedron (prism of vertices the centres of the 6 faces) and of the regular double tetrahedron

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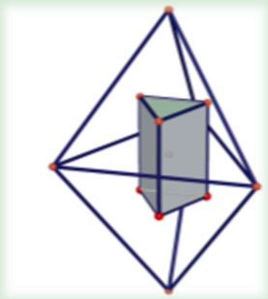


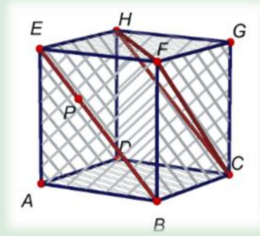
24

The edges emerging from vertex O of the tetrahedron OABC are perpendicular two by two. Show that the orthogonal projection H of O onto the face ΔABC is the orthocentre of the triangle ΔABC. Prove that:

$$\frac{1}{\overline{OH}^2} = \frac{1}{\overline{OA}^2} + \frac{1}{\overline{OB}^2} + \frac{1}{\overline{OC}^2}.$$

Show that the symmetric of O with respect to the centroid of the tetrahedron is the centre of the sphere circumscribed to the tetrahedron.

25



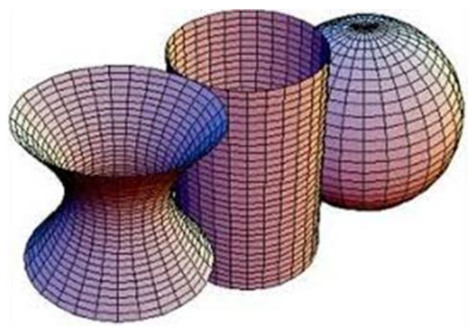
26

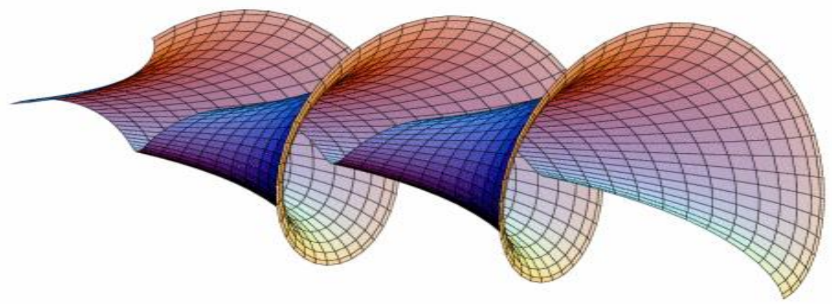
Let ABCDEFGH be a cub of edge 1.
Let P one point of the segment $\overline{BE}$ such that $\overline{EP} : \overline{BE} = 1 : 3$.
Find the distance from point P to the plane determined by the vertices C, F, H of the cube.

27

28

The height of a lateral face of a regular quadrangular pyramid is twice the edge of the base. What percentage of this height of the pyramid (counting from the base) do we have to cut with a plane parallel to the base so that the total area of the lateral surface plus the upper square of the resulting trunk of the pyramid is equal to half the lateral surface of the original pyramid.





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