Pyramid

Construct Pyramids under a given Cube and prove that volume of a pyramid is 1/3 the volume of cube.

Solution

1. Open a new GeoGebra window
2. Switch to Perspectives → 3D Graphing
3. Add Graphics view to the workspace
4. Active the Graphics and create a slider **rotation** running from 0^0 to 90^0 with increment 1^0
   a. Click on slider tool
   b. Select angle
   c. Give name as rotation
   d. Give minimum value 0^0, maximum value 90^0, and increment 1^0
5. Active the Graphics and create a slider **length** running from 1 to 5 with increment 1
   a. Click on slider tool
   b. Select number
   c. Give name as length
   d. Give minimum value 1, maximum value 5, and increment 1
6. Using Input Box, create three points
   A=(length,0,0), B=(length,length,0) and C=(0,length,0)
   Hint: to hide the points from Graphics view
   a. Right click on point
   b. Click on object properties
   c. Select advance tab
   d. In the location option, uncheck Graphics and Graphics 2D
7. Using Input Box, construct a cube as below.
   cube=Cube(A,B,C)
   In the cube, show the name of the eight points A,B,C,D,E,F,G,H
8. Using segment tool, construct a diagonal AG
9. Using midpoint tool, construct the midpoint of AG
   And hide the diagonal AG
   Rename the midpoint as "center"
10. Using Input Box, construct a pyramid
    Pyr1=Pyramid(A, E, F, B, center)
11. Using Input Box, construct a line
    ax1=Line(A, B)
12. Using Input Box, construct a transformation
    Rot1=Rotate(Pyr1, rotation, ax1)
    Hide Pyr1
13. Using Input Box, construct a pyramid
    Pyr2=Pyramid(B,C,G,F, center)
14. Using Input Box, construct a line
    ax2=Line(B,C)
15. Using Input Box, construct a transformation
    Rot2=Rotate(Pyr2, rotation, ax2)
    Hide Pyr2
16. Using Input Box, construct a pyramid
    Pyr3=Pyramid(C,D,H,G, center)
17. Using Input Box, construct a line
    ax3=Line(C,D)
18. Using Input Box, construct a transformation
    Rot3=Rotate(Pyr3, rotation, ax3)
    Hide Pyr3

19. Using Input Box, construct a pyramid
    Pyr4=Pyramid(D,A,E,H, center)
20. Using Input Box, construct a line
    ax4=Line(D,A)
21. Using Input Box, construct a transformation
    Rot4=Rotate(Pyr4, rotation, ax4)
    Hide Pyr4
22. Using Input Box, construct a pyramid
    Pyr5=Pyramid(E, F, G, H, center)
23. Using Input Box, construct a line
    ax5=Line(E,F)
24. Using Input Box, construct a point
    E'=Rotate(E,rotation,ax1)
25. Using Input Box, construct a vector
    translate=Vector(E,E')
26. Using Input Box, construct a transformation
    Rot5=Translate(Rotate(Pyr5, rotation, ax5),translate)
    Hide Pyr5
27. Using Input Box, construct a pyramid
    Pyr6=Pyramid(A,B,C,D, center)
28. Now, design the layouts as much as interactive with text and color features