Task 8   Cross-Sections of the Cube

1. In a new 3D Graphics view, use the Cube tool ![cube] in the ![toolbox] toolbox to create a cube ABCDEFGH. Make it transparent, change its colour to yellow and set its line thickness to "4".

2. Use the Point tool ![point]. Click on the edges HG, EF and AB to create three points I, J, K on the three edges respectively. Colour them in red.

3. Use the Plane through 3 Points tool ![plane], click on I, J and K to create the plane passes through them.

4. Use the Intersect Two Surfaces tool ![intersect], click on the plane **b** and the cube **a** (has to be clicked on in the Algebra view) to create the cross-section of the cube along the plane.

5. Right-click on the cross-section **poly1**, choose "**Create 2D view from poly1**" to create a view from the cross-section.

6. Select the sides of the cross-section. Right-click on them and choose "Object Properties". In the "Basic" tab check the "Show Label" box and choose "Value" to show the lengths of the sides of the cross-section.

7. Drag the red points I, J and K to investigate what quadrilaterals can you get from the cross-section.

8. Drag J to the vertex E. Position I and K to the midpoints of the edges by entering the following commands in the input bar:

    SetValue[I, Midpoint[H, G]]
    SetValue[K, Midpoint[A, B]]

    What is the shape of the cross-section?