

Task D: Paper folding

To construct the 3D model according to a question in Paper 1 of Compulsory Part, HKDSE 2018.

圖 3(a) 中， $ABCD$ 為一紙卡，其形狀為平行四邊形。已知 $AB = 60\text{ cm}$ 、 $\angle ABD = 20^\circ$ 及 $\angle BAD = 120^\circ$ 。

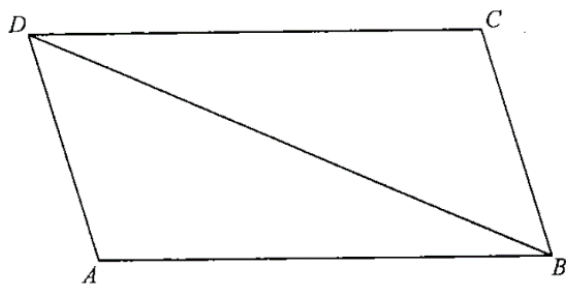


圖 3(a)

(b) 將圖 3(a) 中的紙卡沿 BD 摺起，使得 A 與 C 間的距離為 40 cm (見圖 3(b))。

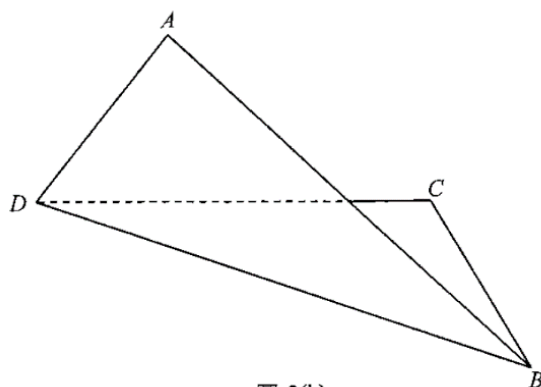
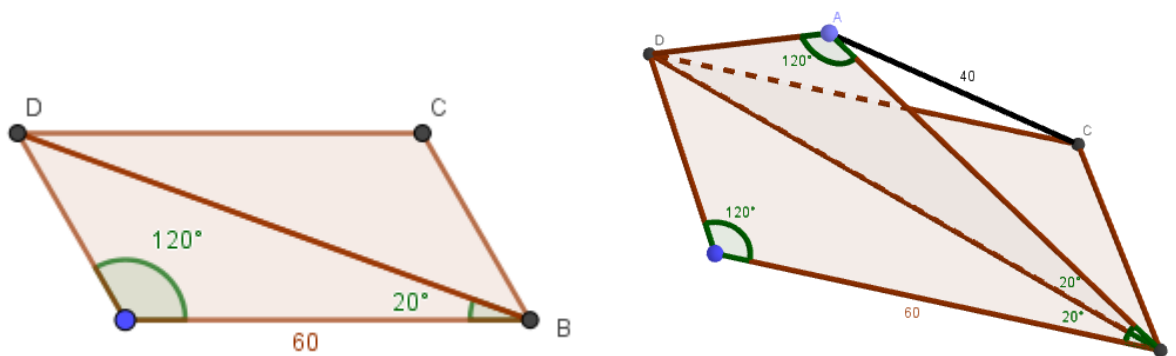
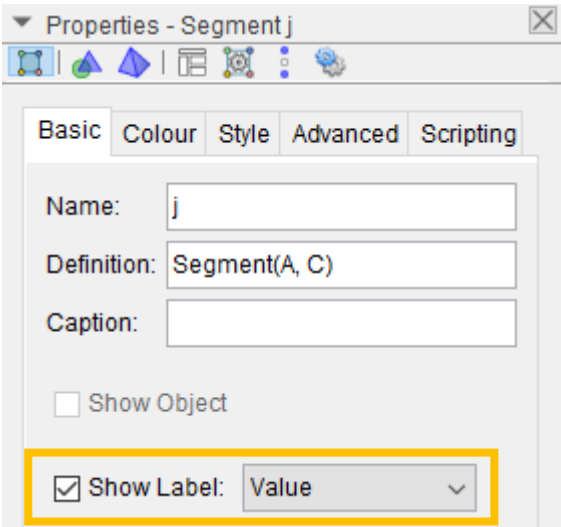


圖 3(b)



Steps	Objects to be created	Action
1.	The Parallelogram	<p>In “Graphics” view:</p> <ul style="list-style-type: none"> ◆ Create point X as reference point, say (0,0). ◆ Create point B that is “X+ (60, 0)”. ◆ Rotate X by 20° (clockwise) about B to X'. Construct a straight line f connecting B and X'. ◆ Rotate B by 120° (anticlockwise) about X to B'. Construct a straight line g connecting X and B'. ◆ Locate the intersection point (D) of the lines f and g. ◆ Construct the point C which is “D + (60, 0)”. ◆ Hide appropriate lines and points. ◆ Construct the polygon with vertices X, B and D. ◆ Construct the polygon with vertices B, C and D.

Steps	Objects to be created	Action
2.	The paper folding process.	<p>In “3D Graphics” view</p> <ul style="list-style-type: none"> ◆ Construct a circle with axis BD through the point X. ◆ Construct a sphere with centre C and radius 40. ◆ Select “Intersect” and click the circle and the sphere. Two intersecting points F and G would then be created. Select the appropriate point, say F, and hide the other point. ◆ Create a point E on the minor arc of X and F. ◆ Construct Circumcircular Arc X, E and F. ◆ Create a point A on the said circumcircular arc and then hide the circumcircular arc. ◆ Construct the polygon with vertices A, B and D. ◆ Select the segment AC (say “j”). Show “Value” only.  <p>In the Advanced Tab of the properties of j, input “$j = 40$” as a condition to show object.</p> 