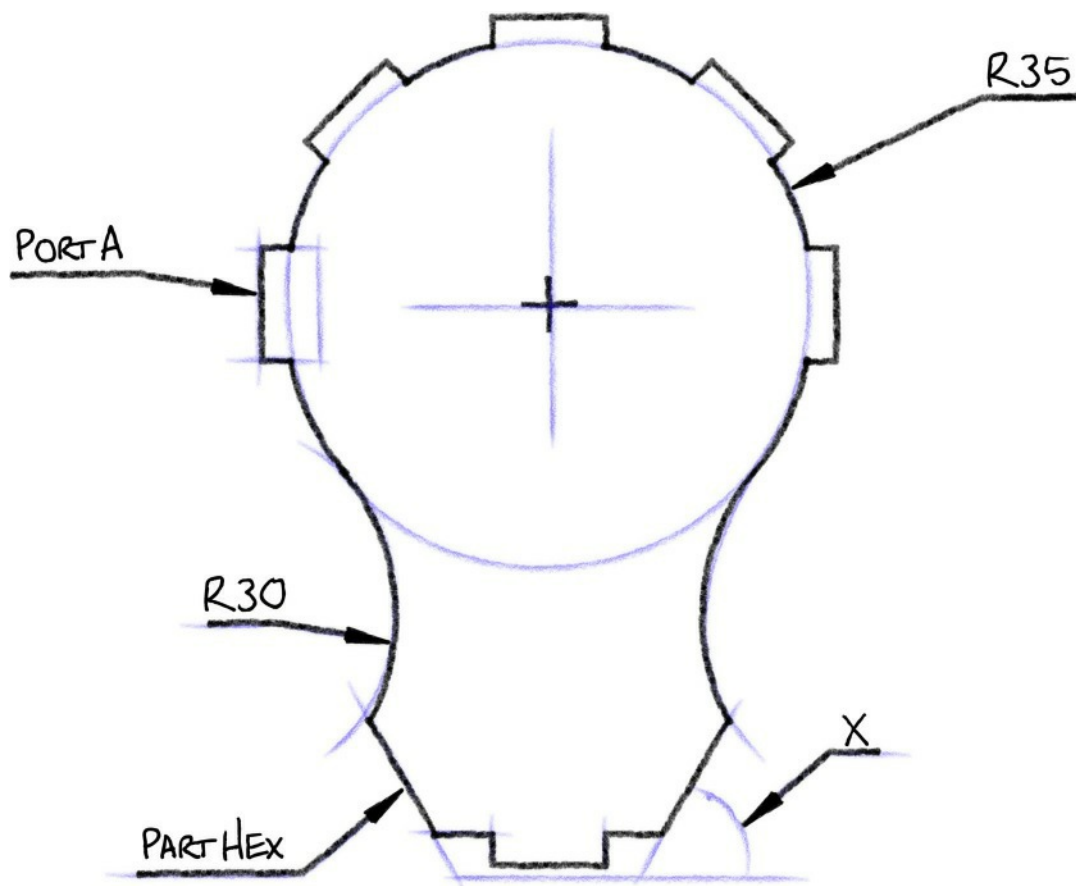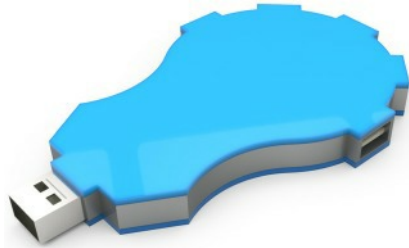1. A USB hub has been modelled by a CAD technician.

A 3D CAD model of the USB hub and its preliminary sketch are shown above.

1. (continued)

(a) Describe, with reference to 2D drawing techniques, how you would create a tangent between the R30 and the R35 arcs. You may write your answer and/or sketch in the preliminary sketch on the previous page to support your answer if you prefer. **5**

_____

_____

_____

_____

_____

_____

_____

The USB adaptor has five ports around the upper arc. The CAD technician created a 2D drawing using the information on the preliminary sketch. When drawing the ports, port A was used as the starting point.
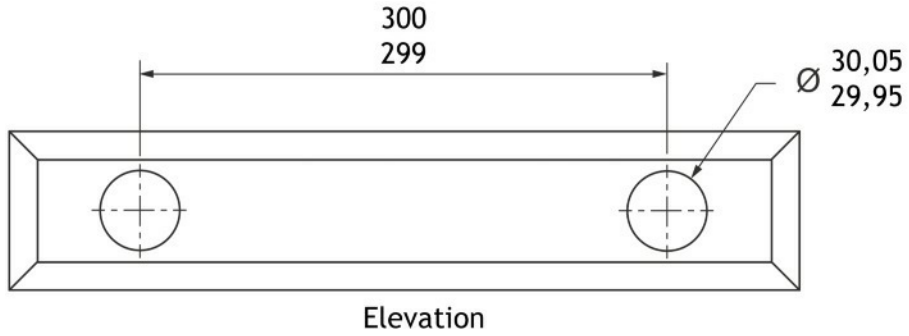
(b) Describe, with reference to 2D CAD drawing techniques, how the CAD technician would draw the other ports. You may write your answer and/or sketch in the preliminary sketch above to support your answer if you prefer. **4**

_____

_____

_____

_____

(c) The USB hub is symmetrical about the vertical centre axis.

State angle X. **1**

_____

8.

300
299

Ø 30,05
   29,95

Elevation

A 3D CAD model and elevation of a bracket are shown above.

The location pins, each Ø30 mm, are set apart at 300 mm nominal centres. There are tolerances on both the **sizes and location** of the pins.

(a) Calculate the maximum and minimum gap between the pins.   **2**

Maximum _____

Minimum _____

(b) Explain why tolerances are an important feature in production drawings for manufacturing.   **2**

_____

_____

_____

_____