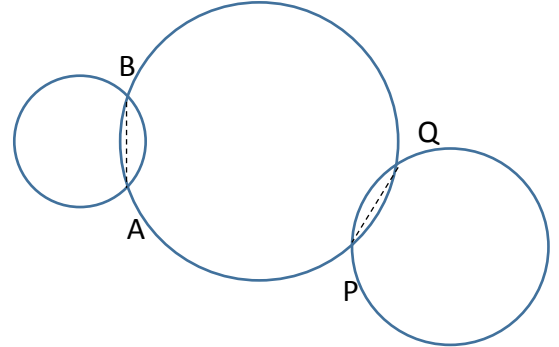


Section 2: Circular measure

Exercise level 3 (Extension)

1. [Make sure your calculator is set in radian mode throughout this question.]

An ornamental garden pond is designed as three circles of radii 2 metres, 4 metres, and 3 metres, as in the diagram. The circles overlap so that the chords forming the lines of intersection AB and PQ are both of length 1 metre.



- (i) Find, in radians, the angles α , β , γ subtended at the three centres by the intersection chords AB and PQ.
 - (ii) Find the length of the perimeter of the complete pond.
 - (iii) Find the surface area of the pond.
2. An experimental botanical laboratory consists of two hemispherical domes, of radii 30 metres and 20 metres respectively, intersecting with their centres at A and B. The points at ground level where the two domes meet are P and Q, and the line PQ has length 8 metres.

- (i) Find the angles subtended at the centres A and B by the line PQ.
- (ii) Find the total floor area enclosed by the intersecting domes.
- (iii) The 2 domes are separated by a partition wall, vertically above PQ. Find the area of the wall.
- (iv) A power cable runs along the curve of the intersection of the two domes. Find the length of the power cable.
- (v) The smaller dome is also partitioned by a vertical wall, directly above the line of centres AB. Find the area of this wall.
- (vi) Find the total perimeter of the two intersecting domes at ground level.

