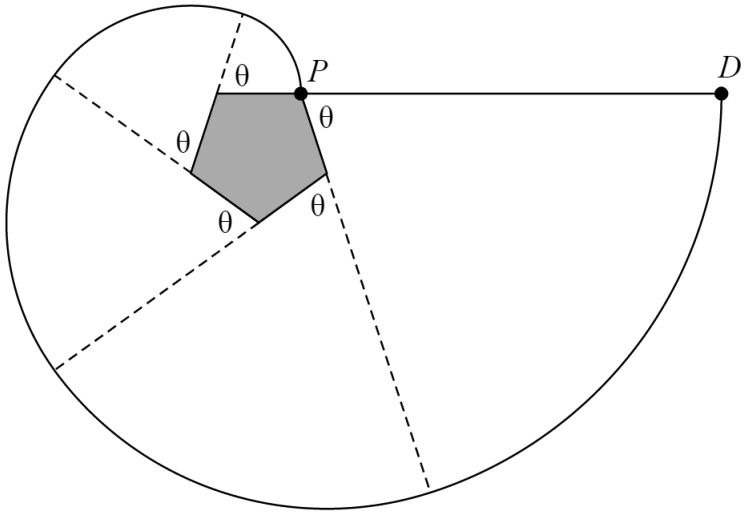
1. *[Length: 45 minutes]*

In this problem you will investigate the distance walked by a dog attached to a tree.

A dog at point D is attached to a tree at point P with a lead of length 8 m. The tree has a cross-section in the shape of a regular n-gon with a perimeter of 8 m. The dog walks clockwise around the tree keeping the lead tight at all times.

The diagram below shows the case when $n = 5$.



Investigate the distance the dog walks.

Task Specific Rubric for Critetion B: Investigating Patterns

Level	Descriptor
1 – 2	The student is able to ∘ find angles, radii and arc lengths for two different values of n
3 – 4	The student is able to ∘ find the total distance walked for two different values of n
5 – 6	The student is able to ∘ find angles, radii and arc lengths in terms of n
7 – 8	The student is able to ∘ find the total distance walked in terms of n ∘ find the total distance walked when the cross-section is circular