9. A circle with centre $A(3, -1)$ passes through the point $P(-9, 8)$ and the point $Q(15, -10)$

(a) Show that PQ is a diameter of the circle.

(2)

(b) Find an equation for the circle.

(3)

A point R also lies on the circle.
Given that the length of the chord PR is 20 units,

(c) find the length of the shortest distance from A to the chord PR.
Give your answer as a surd in its simplest form.

(2)

(d) Find the size of angle ARQ, giving your answer to the nearest 0.1 of a degree.

(2)