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$z$  and  $f(z)$  are both complex numbers.

1.  $A(z_0)$  is a fixed point by  $f$  in the complex plane. Evaluate  $z_0$ .
2.  $P(z), Q(f(z))$  are two points in the complex plane.  $C$  is a circle with radius 2 whose centre is the point  $A$ . Find the maximum area of  $\triangle APQ$  when the point  $P$  moves in the circumference of  $C$ .