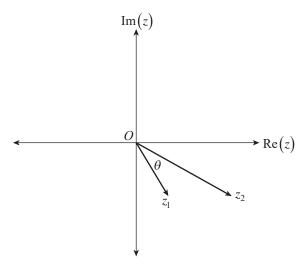
## Question 3 (7 marks)

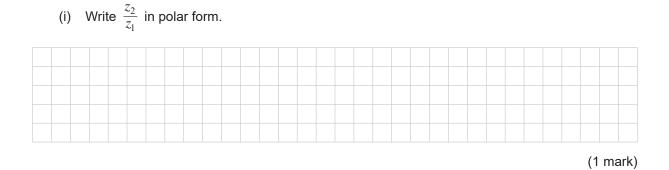
(a) Write the following complex numbers in exact polar form.

(i) $z_1 = $	$\overline{3}-3i$							
							(1 n	nark)
							( ' ' '	iany
(ii) $z_2 = 3$	$\sqrt{3}-3i$							
(ii) $z_2 = 3$	$\sqrt{3}-3i$							
(ii) $z_2 = 3$	$\sqrt{3}-3i$							
(ii) $z_2 = 3$	$\sqrt{3}-3i$							

(b) Complex numbers  $z_1$  and  $z_2$  from part (a) are shown on the Argand diagram in Figure 2. The measure of the acute angle between  $z_1$  and  $z_2$  is  $\theta$ .



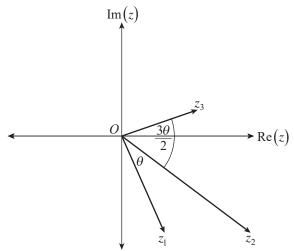




(ii) State the exact value of  $\theta$ .

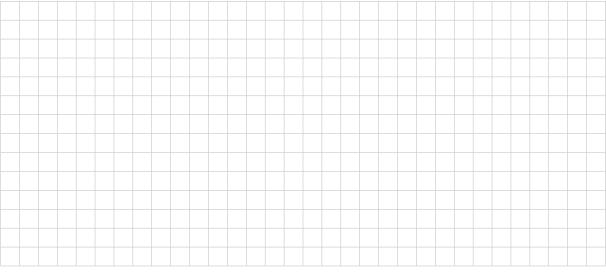
(1 mark)

(c) The complex number  $z_2$  from part (a) is scaled by a factor of  $\frac{1}{2}$  and rotated anticlockwise about the origin *O* through  $\frac{3\theta}{2}$  to produce complex number  $z_3$ , as shown on the Argand diagram in Figure 3.





Using the value of  $\theta$  found in part (b)(ii), find  $z_{\rm 3}$  in exact polar form.



(3 marks)