

1. The polar curve  $r = \sin \theta$  is a circle given in the figure below. Find the area of the shaded region.



2. Write the first 4 terms of the sequence  $a_n = \frac{2^n}{n}$ .

3. Let  $\{a_n\}$  be a sequence defined recursively as follows:  $a_0 = 1$  and  $a_{n+1} = 2a_n + 1$ . Find  $a_4$ .