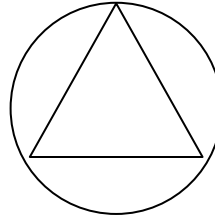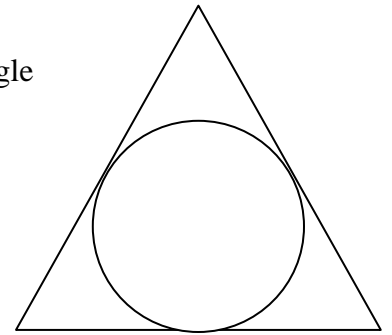# APPROXIMATION OF π

1. Use trigonometric ratios to find the area of an equilateral triangle inscribed in a circle with radius 1.

2. Use trigonometric ratios to find the area of an equilateral triangle circumscribed around a circle with radius 1.
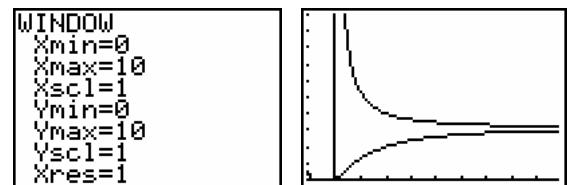
3. Use a similar method to fill in the following chart.

n = number of sides of a regular polygon	Area of polygon inscribed in circle	Area of polygon circumscribed around circle
3		
4		
5		
6		
7		
8		
9		
10		
12		
100		
1000		
10000		
n		

4.   Find a general equation for the area of a regular polygon inscribed in a circle of radius 1.

5.   Find a general equation for the area of a regular polygon circumscribed around a circle of radius 1.

6.   Do the values in the second and third columns of the chart above appear to be converging? If so, to what value are they converging?

7.   Explain why your answer to question #6 is what it is.

8.   Graph both of these equations on your calculator.

```
WINDOW
 Xmin=0
 Xmax=10
 Xscl=1
 Ymin=0
 Ymax=10
 Yscl=1
 Xres=1
```


9.   Why do the graphs jump around for values of x between 1 and 3?

10.   Choose a larger horizontal viewing window and trace each graph. For what value of x does each equation approximate π to two decimal places? Three decimal places? Four decimal places? Five?