

Math 2413  
Calculus I  
Lab Exercise # 5

Name \_\_\_\_\_

Date \_\_\_\_\_

Section # \_\_\_\_\_

Semester \_\_\_\_\_

Attach the computer printouts to this sheet.

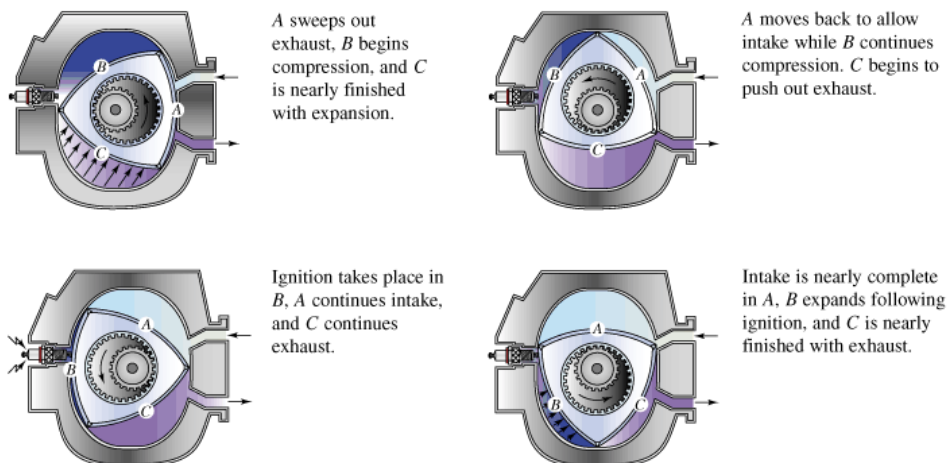
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1. Use Simpson's or Trapezoid method, use  $n = 16$ . Do the work on the 89 or on Converge, include printouts of all stages of your work.
2. No assistance necessary.
3. remember that one inch is 4 blocks. Hint: if the bulges are eliminated the resulting triangle is an equilateral triangle. If you add all the pieces you should get the right answer.

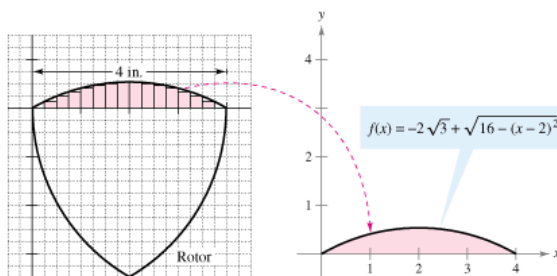
## The Wankel Rotary Engine and Area

Named for Felix Wankel, who developed its basic principles in the 1950s, the Wankel rotary engine presents an alternative to the piston engine commonly used in automobiles. Many auto makers, including Mercedes-Benz, Citroën, and Ford, have experimented with rotary engines. By far the greatest number of Wankel-powered vehicles have been put on the road by Mazda, whose current rotary engine design is the RX-7.

The Wankel rotary engine has several advantages over the piston engine. A rotary engine is approximately half the size and weight of a piston engine of equivalent power. Compared with about 97 major moving parts in a V-8 engine, the typical two-rotor rotary engine has only three major moving parts. As a result, the Wankel engine has lower labor and material costs and less internal energy waste.



Although many different designs are possible for the rotary engine, the most common configuration is a two-lobed housing containing a three-sided rotor. The size of the rotor in comparison with the size of the housing cavity is critical in determining the compression ratio and thus the combustion efficiency.



### QUESTIONS

1. The region shown in the figure on the right above is bounded above by the graph of

$$f(x) = -2\sqrt{3} + \sqrt{16 - (x-2)^2}$$

and below by the  $x$ -axis. Describe different ways in which you might approximate the area of the region. Then choose one of the ways and use it to obtain an approximation. What type of accuracy do you think your approximation has?

2. Now that you have found one approximation for the area of the region, describe a way that you can improve your approximation. Does your strategy allow you to obtain an approximation that is arbitrarily close to the actual area? Explain.
3. Use your approximation to estimate the area of the “bulged triangle” shown in the figure on the left above.

*The concepts presented here will be explored further in this chapter. For an extension of this application, select the Calculus Lab button.*

**Calculus Lab**

