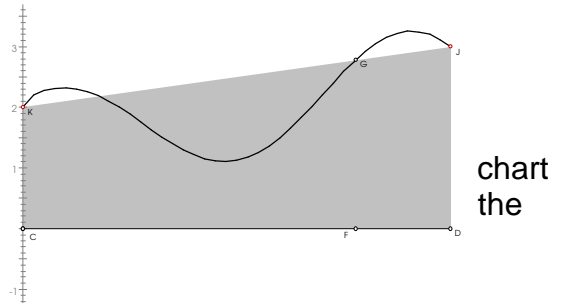


Student Activity Sheet Trapezoid Sum Approximation

Not all definite integrals are easily evaluated—they may not have an easy antiderivative. You will approximate the value of the given integral by following the following steps.

$$\int_0^7 \frac{\sqrt{x} * \cos(x)}{2} dx$$

1. Open up the sketch called Trapsum in Geometer's SketchPad. The function is already graphed for you; note that when you drag F on the x-axis, the point G travels along the graph. Our mission is to approximate the area bounded by the graph, the x-axis, and the vertical lines $x = 0$ and $x = 7$.
2. Construct trapezoid CKJD by selecting the vertices, then Construct, Polygon Interior. Measure its area. This is our first approximation. $N=1$ since there is just one trapezoid being used. Fill in the area in the below. Is this area greater than or less than desired definite integral? Why?



3. As you progress through this activity, it will be simplest if you delete the preceding trapezoids as you complete each step. To do this, select only the polygon interior, then hit delete.
4. To fill in the $N = 2$ row of the chart, you need to construct two trapezoids. (They need not have the same heights.) You will need to construct segments perpendicular to the x-axis intersecting the graph of the function. Remember to construct a perpendicular you must first select a point and the segment. After you have constructed the trapezoids, calculate their areas and add them together. Put their sum in the second row of the chart.
5. Fill in the rest of the chart by making more and more trapezoids.

N = number of trapezoids	Area of trapezoid(s)
1	
2	
5	
8	
10	

6. Using your graphing calculator, calculate the integral given.

Calculator value: _____

How close was your answer? How could you get a better approximation?

7. Given a table of values for the function on the interval [0, 7], without using SketchPad, how could you approximate the definite integral? Remember that the formula for the

area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$

Use your method to approximate the integral using the values given. Show all work!!!

x	0	1	2	3	4	5	6	7
f(x)	2.000	2.270	1.706	1.143	1.346	2.317	3.176	2.997