INTEGRATION

Use CAS to calculate $\int_{0}^{10} x^2 dx = \frac{1000}{3}$.	F1 THE RIGEbra Calc Other PrgmIO Clean Up
	■ NewProb Done
We can subdivide [0, 10] into intervals of unit length and form rectangles with heights determined by the function $f(x)$	Part Algebra Calc Other PrgmIO Clean Up NewProb Done
values from the left endpoint of each interval.	• $\int_{0}^{10} (x^2) dx$ $\frac{1000}{3}$ • $\sum_{i=0}^{9} (i^2)$ 285
Use CAS to calculate $\sum_{0}^{9} i^{2}$	STATVARS RAD EXACT FUNC 3/30
We can use the right endpoints. Use CAS to calculate $\sum_{i=1}^{10} i^2$.	$ \int_{0}^{f_{1}} \frac{1000}{3} dx $
1	$ \int_{0}^{10} (x^{2}) dx \qquad \frac{1000}{3} \\ = \sum_{i=0}^{9} (i^{2}) \qquad 285 \\ 10 < 10 < 10 $
Check both of these calculations by hand.	■ $\sum_{i=1}^{10} (i^2)$ 385 = 1 EXI^2, i, 1, 10) STATYARS RAD EXACT FUNC 4/30
Divide the interval into smaller intervals. (1000 intervals) so each interval has a 10 1	$ \begin{bmatrix} f_1 & f_2 \\ \bullet & f_2 \\ \bullet & f_2 \\ \bullet & f_2 \\ \bullet & f_1 \\ \bullet & f_2 \\ i = 1 \\ 999(\dots, 2^2) \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $
width of $\frac{10}{1000} = \frac{1}{100}$ The left end point approximations gives:	$= \sum_{i=0}^{999} \left[\left(\frac{i}{100} \right)^2 \cdot .01 \right] \qquad \frac{665667}{2000} \\ = \sum_{i=0}^{999} \left[\left(\frac{i}{100} \right)^2 \cdot .01 \right] \qquad 332.8335$
$\sum_{0}^{999} \left(\frac{i}{100}\right)^2 \times 0.01 \approx 332.8335$	i=0[[100] ∑< <i td=""> X X X X X X X X X X X X X X X X X</i>
The right end-point approximation gives: $\sum_{i=1}^{1000} (\frac{i}{100})^2 \times 0.01 \approx 333.8335$	$ \begin{array}{c c} \hline 1 & \hline 1 \hline 1$
$\frac{1}{1}$ 100 [°]	$ \begin{array}{c c} \bullet & & \\ \hline \bullet & & \\ \hline \bullet & \hline \hline \bullet & \\ \hline \bullet & \hline \hline \bullet & \\ \hline \bullet & \hline \hline \hline \bullet & \hline \hline \bullet & \hline \hline \bullet & \hline \hline \hline \hline$
So the student can see that as the number of subdivisions increases, the	X<(i/100)^2*.01,i,1,1000> STATVARS RAD EXACT FUNC 7/30
approximation approaches the true value of $\int_{0}^{10} x^{2} dx = \frac{1000}{2}$.	
$\begin{bmatrix} 01 \\ 0 \\ 0 \end{bmatrix} x ax = \frac{3}{3}.$	