HomeWork1 mat 156

Homework

1. In class Assignment: Use the Maple Command to show Riemann sum for exp(-x) from 0 to 1.
    1. **with(Student[Calculus1]);**
       RiemannSum(exp(-x), x = 0 .. 1, method = upper, partition =20, output = plot);
    2. **Change the upper bound from 1 to 2. What happens.**
    3. **Put a variable b before the RiemannSum command and set b to higher and higher values. Keep on doing this. You have to change partitions to higher values to get good approximations to the areas. What is happening.**
2. Use the **Tools--Tutors--Calculus1--Riemann Sum** tutor to get approximations to the area of the following regions. This tutor is found in the drop down menu under **Tools** on top of the maple window. The a, b in the tutor and the function define the region we want. For functions that are strictly positive or negative the actual area is trapped between the upper Rieman Sum and the lower Rieman Sum. For each problem use this fact to estimate the number of regions you must use to get the correct area to within .01. You should not just use what you can calculate from formulas in calculus for these problems but you can check your answers with these calculations.
    1. sin(x) between 0 and pi (their default).
    2. f(x) := x->3 (you would put 3 for f(x) in their tutor, In regular math notation we say f(x)=3) between 0 and 1. Can you calculate the area from geometry?
    3. f(x) := x->2*x (you would put 2*x in their tutor) between 0 and 1. Can you calculate the area from geometry?
    4. f(x) := x-> (1-x^2)^.5 (just put value on right in their tutor) between 0 and 1. Can you calculate the area from geometry and what the graph is. You should plot the function with the command $f := x \to (1 - x^2)^{.5};$ $plot(f(x), x = -1..1, scaling = constrained);$ The constrained option makes sure that the axis have the same units and figures will appear with proper proportions. Look at upper and lower and find a number of regions so that you know the Riemann Sum within .01.
    5. f(x) := x^2; between 0 and 1. Can you calculate this from geometry. How about from the calculus you have just learned.Look at upper and lower and find a number of regions so that you know the Riemann Sum within .01. You cannot use the knowledge of the actual Riemann sum that you can calculate with Maple or by hand integration methods.
    6. f(x) := exp(x) between 0 and 1. Can you calculate this from geometry. How about from the calculus you have just learned.
    7. f(x):= sin(x) between -Pi/2 and Pi/2. Is the upper sum always bigger than the lower sum? (find this out by experimentation)
    8. f(x):= exp(-x) between 0 and 1; How about between 0 and 2; 0 and 3; 0 and 100; What do you see happening.