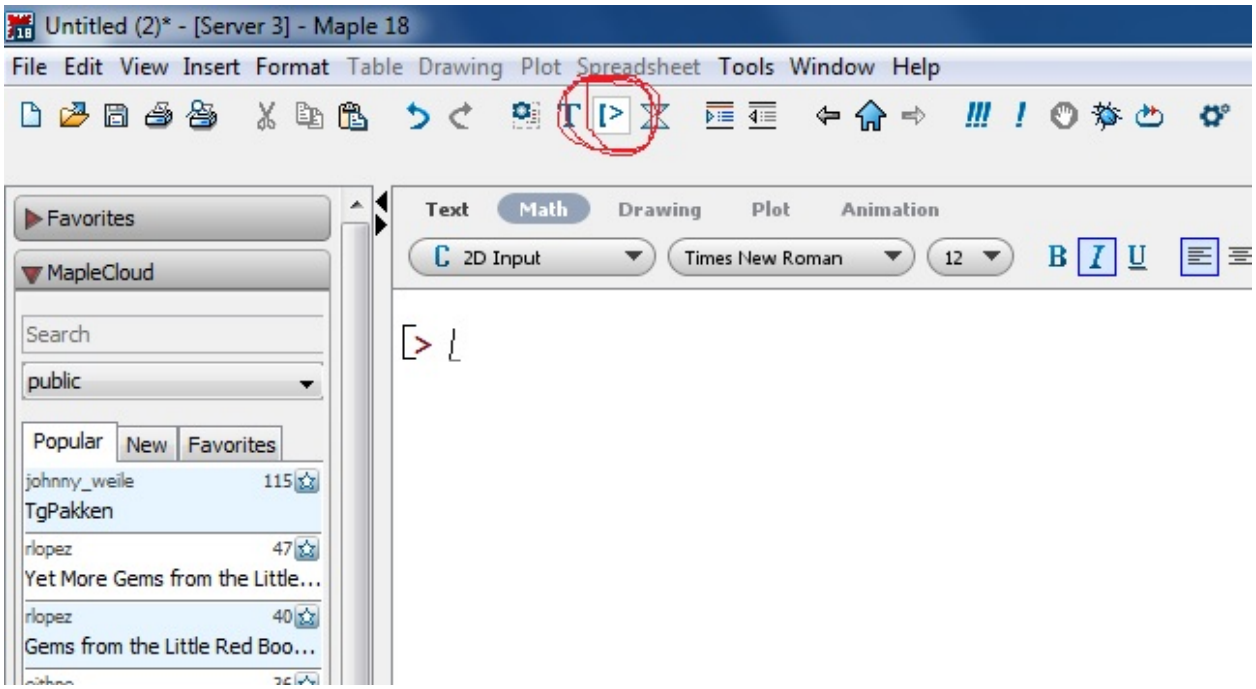
Lab 04 Expectations

Submit Plots: 4, 5

1. **Solve each initial value problem.**
2. **a. Use dsolve in Maple to find f and g.**
3. **b. Substitute the equations into (**) to make sure these functions satisfy the differential equation.**
4. **c. Substitute h(x) into the left side of (**). What do you get?**
5. **d. Prove that if f(x) and g(x) are solutions to (*), then h(x)=f(x)-g(x) is a solution to y' + p(x)y = 0.**
6. **e. Use dsolve to find the solution to the homogeneous equation given. Add the right side of the answer to g(x). Substitute F(x)=:yh(x)+g(x) into the left side of the differential equation. What do you get?**
7. **f. Use dsolve to find the solution to y' + x^3y = x^3. Does this expression you get describe the same set of solutions as in (e). Explain.**
8. **Using dfield7, plot several solutions to the differential equation y' = y^2. Does the place where they cease to exist seem to depend on initial conditions?**
9. **Use dfield7 to plot the given equation. Plot curves corresponding to y(0)=100 and y(0)=1000. Are both solutions unbounded near x=2? How does the differential equation make you expect this?**
10. **Use dfield7 to plot the solution to the given IVP. Describe the behavior as x goes to 2. Plot the solution corresponding to y(0)=2. Does there appear to be a condition for which the solution is not unique? Explain why the Theorem does not hold at this point. Plot the solution with y(3)=1. How does the behavior of the system at x=2 differ from the solution to y(0)=2 near x=2.**

Lab 4 Notes

In Maple 18, make sure you use click on the “[>" button to activate the command line text instead.