Quiz #8, Friday October 23
Math 221 Lecture EL1

Instructions. Be sure to show your work and explain your reasoning where necessary for full credit. Leave answers in exact form—remember “exact form” means numbers like $e^7$ and $\pi$ and $\sqrt{2}$ are OK. It means don’t worry about finding the decimal approximation. This quiz has two problems. They are each worth five points.

1. Let $f(x) = x^2 \ln x$

   (a) (2 points) Find the intervals of increase and decrease of $f(x)$, any local maxima and minima of $f(x)$, and the values of $f(x)$ (un-simplified OK) at all local optima.

   (b) (2 points) Find the intervals of concavity of $f$, and the values of $f(x)$ (un-simplified OK) at all inflection points.
(c) (1 point) Which graph shown in the pictures below is the graph of \( f(x) \)? Just circle your choice, no partial credit will be given for explanations or justifications for this part of the problem.

Choice 1 for Problem 1

Choice 2 for Problem 1

Choice 3 for Problem 1
2. Find the dimensions of the largest rectangle that can be inscribed in a circle of radius $r$. The word “inscribed” means that the four corners of the rectangle are on the circle, and the whole rectangle is inside the circle.