

Show all work, including mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation, identifying expressions by their proper symbols (introducing them if necessary), and use EQUAL SIGNS and arrows when appropriate. Always SIMPLIFY expressions. BOX final short answers. LABEL parts of problem. Keep answers EXACT (but give decimal approximations for interpretation). Indicate where technology is used and what type (Maple, GC).

1. a) Find the total positive area between the graphs $y = \frac{x}{1+x^2}$, $y = \frac{1}{2}x$.
- b) Repeat for the graphs $y = \frac{x}{1+x^2}$, $y = mx$, where $0 \leq m < 1$.
- c) Why must m satisfy the condition $0 \leq m < 1$ for this problem to make sense? Explain.
- d) Find the numerical value of m (to 6 decimal places) for which the total area is 1.
- e) **Optional.** Find the exact value of m for which the total area is 1.

► solution