

I prefer that you submit your answers on a printed copy of this document, like it's a quiz or exam. However, you may instead rewrite the questions by hand before solving them. Staple sheets together, in order. **Be neat. Always give enough work and clear explanation so that fellow students could follow what you did (from start to finish) just by reading your paper.** Numbers in [ ] give point values for each question.

- [6] 1. Pretend that I *just* learned about the equations of 3D lines, and explain clearly to me how you know that the lines  $\mathbf{r}_1(t) = \langle 3 - t, 0.5 + 3t, -2 - 2t \rangle$  and  $\mathbf{r}_2(\tau) = \langle 0.25\tau + 2, -.75\tau, .5\tau - 4 \rangle$  are parallel and distinct.

- [6] 2. Find the equation of the plane that contains both of the lines given in problem #1.

[8] **3.** Using only your brain, draw a contour map for the function  $z = f(x, y) = \frac{y}{x^2 - 2x + 2}$ .

Show level curves for  $z$ -levels of  $-2, -1, -\frac{1}{2}, 0, \frac{1}{2}, 1, 2$ . Label each level curve with its  $z$ -level.