

Math 13, Winter 2018

## Homework set 7, due Wed Feb 21

*Please show your work. No credit is given for solutions without justification.*

- (1) Find the surface area of the part of the cone  $z^2 = 2x^2 + 2y^2$  with  $0 \leq z \leq 2$ .
- (2) Calculate  $\iint_{\mathcal{S}} (xy + e^z) dS$ , where the surface  $S$  is the triangle with vertices  $(0, 0, 2)$ ,  $(1, 0, 1)$ ,  $(0, 4, 0)$ .
- (3) Let  $S$  be the boundary of the unit cube  $0 \leq x \leq 1$ ,  $0 \leq y \leq 1$ ,  $0 \leq z \leq 1$ . Note that  $S$  is a closed surface with six faces. The surface  $\mathcal{S}$  is oriented with outward pointing normals. Calculate the flux of the vector field  $\mathbf{F} = \langle x, y, z \rangle$  through  $S$ .