

**MATH 275**

December 3, 2007

Names \_\_\_\_\_

1. Let  $S$  be the surface of the portion of the paraboloid  $z = 4 - x^2 - y^2$  for which  $z \geq 0$ . Sketch the surface  $S$ .

2. Describe the boundary curve  $C$  of  $S$ .

3. Define  $C$  parametrically.

4. Use Stokes theorem to change the surface integral

$$\iint_S \nabla \times \mathbf{F} \cdot d\mathbf{S}$$

where  $S$  is the portion of the paraboloid  $z = 4 - x^2 - y^2$  for which  $z \geq 0$  and  $\mathbf{F} = 2z\mathbf{i} + 3x\mathbf{j} + 5y\mathbf{k}$ , into a line integral. Evaluate the integral.