

## Vector Analysis

Spring 2014

Ex Tempore 2

Mon 10.3.

1. Write a parametric presentation  $\vec{r}(t) = \vec{r}(x(t), y(t), z(t))$  for the curve  $y = x^2, z = 0$ , where the starting point is  $(-1, 1, 0)$  and the end point is  $(1, 1, 0)$ . Draw it. Evaluate the line integral of the vector field  $\vec{F} = 5x^2\hat{i} + 6y\hat{j} + 7z\hat{k}$  along this curve.
2. Is the field  $\vec{F} = 5x^2\hat{i} + 6y\hat{j} + 7z\hat{k}$  conservative? If yes, give the corresponding potential  $\phi(x, y, z)$ . Evaluate the line integral of  $\vec{F}$  from the point  $(-1, 1, 0)$  to the point  $(1, 1, 0)$  along the line connecting the two points.
3. Is the field  $\vec{F} = 6y\hat{i} + 5x^2\hat{j} + 7z\hat{k}$  conservative?