Welcome to the Weekly Review for MATH 2451. This week’s review talks about Path and Line Integrals. We would like to thank Leszek Kisielewski and the Spring 2015 MATH 2451 students for allowing us to film the Weekly Reviews.

The following problems are presented in the video. Thank you!

1. Background Information
2. Find \( \int_{\vec{c}} \vec{F} \cdot d\vec{s} \) given a path \( \vec{c} \) and \( \vec{F} = \begin{bmatrix} xy \\ -y^2 \end{bmatrix} \)
3. Find the work done by the force \( \vec{F} = \begin{bmatrix} xy \\ -y^2 \end{bmatrix} \) along the path from \((0, 0)\) to \((2, 1)\).
4. Find the work done by the force \( \vec{F} = \begin{bmatrix} xy \\ -y^2 \end{bmatrix} \) along the path given by the parameterization \( x = t \) and \( y = \frac{1}{4}t^2 \).
5. Integrate $f(x, y, z) = \frac{1}{2}$ over the path which is the intersection of surfaces given by $2y^2 - 3x^4 = 0$ and $z - x^3 = 0$ starting at $(1, \sqrt{\frac{3}{2}}, 1)$ to $(2, \sqrt{6}, 8)$.
6. The Fundamental Theorem of Calculus
7. Integrate \( \int (ydx + xdy + zdz) \) over the path of death starting at \((1, 2, 1)\) to \((0, 3, 2)\)
8. Evaluate \( \int_{c_1} \frac{xdy - ydx}{x^2 + y^2} \) where \( c_1 \) is given by the circular path drawn on the board going clockwise.