

# 16.1-2: Vector Fields, Line Integrals

Wednesday, April 13

## Vector Fields

Sketch the force fields generated by...

1. A planet
2. Two planets with the same mass
3. Two particles with charges  $Q$  and  $-Q$
4. The function  $\mathbf{F}(x, y) = \frac{y\mathbf{i} - x\mathbf{j}}{\sqrt{x^2 + y^2}}$

Sketch the level curves and gradient vector field of  $f(x, y) = x^2 - y$  and  $g(x, y) = \ln(1 + x^2 + y^2)$ .

### Line Integrals

Find the line integral  $\int_C xy^4 ds$  where  $C$  is the right half of the circle  $x^2 + y^2 = 16$ .

Find the line integral  $\int_C (x + 2y) dx + x^2 dy$ , where  $C$  consists of line segments from  $(0, 0)$  to  $(2, 1)$  and from  $(2, 1)$  to  $(3, 0)$ .