Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Let  $\mathbf{F}(x,y) = \langle 4x, xy \rangle$ . Compute  $\int_C \mathbf{F} \cdot d\mathbf{r}$  for *C* the top half of a circle with radius 3 centered at the origin, traversed counterclockwise.