

Recorder: \_\_\_\_\_

Task Master: \_\_\_\_\_ Cynic: \_\_\_\_\_ Other: \_\_\_\_\_

## STOKES' THEOREM

*Working in small groups (3 or 4 people), solve as many of the problems below as possible. Try to resolve questions within the group before asking for help. The Recorder is responsible for writing up the group's results and turning it in. Show your work! Full credit will only be given if your answer is supported by calculations and/or explanations as appropriate.*

1. Evaluate  $\oint_C \vec{F} \cdot d\vec{r}$  explicitly as a line integral, where  $\vec{F} = r^3 \hat{\phi}$  and  $C$  is the circle of radius 3 in the  $xy$ -plane, oriented in the usual, counterclockwise direction (as seen from above).
2. **Stokes' Theorem**
  - (a) List at least 3 different surfaces which you could use with Stokes' Theorem to evaluate the line integral in the previous problem
  - (b) Evaluate the surface integral for any one of the surfaces on your list.
  - (c) If time permits, evaluate the surface integral for other surfaces on your list.