Recorder: _____

Task Master: _____ **Cynic:** _____ **Other:** _____

POTENTIAL FUNCTIONS

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.

For each of the following vector fields, find a potential function if one exists, or argue that none exists.

1. $\vec{\boldsymbol{F}} = (3x^2 + \tan y)\,\hat{\boldsymbol{\imath}} + (3y^2 + x\sec^2 y)\,\hat{\boldsymbol{\jmath}}$
2. $\vec{\boldsymbol{G}} = y\,\hat{\boldsymbol{\imath}} - x\,\hat{\boldsymbol{\jmath}}$
3. $\vec{\boldsymbol{H}} = (2xy + y^2\sin z)\,\hat{\boldsymbol{\imath}} + (x^2 + z + 2xy\sin z)\,\hat{\boldsymbol{\jmath}} + (y + z + xy^2\cos z)\,\hat{\boldsymbol{k}}$
4. $\vec{\boldsymbol{K}} = yz\,\hat{\boldsymbol{\imath}} + xz\,\hat{\boldsymbol{\jmath}}$