

Name: _____

PHYS 505: Classical Mechanics (graduate), Extended Quiz #2

Instruction: use additional sheets if you find it necessary

1. The paraboloid $z = x^2 + y^2$ is intersected by a plane $x + y + 2z = 2$ in an ellipse. Find the coordinates of the points on this ellipse that are nearest to and farthest from the origin.
2. A mass m is suspended by a spring in a uniform gravitational field. The spring constant is k . In addition to longitudinal spring vibration, the system also performs a planar pendulum motion. Find the Lagrangian and derive the equation(s) of motion. Then consider the case of a small amplitude motion and find the solution of those equation(s) if possible. What would you expect to see in this case?

