Download and run this *Mathematica* notebook or this Geogebra applet.
You have four different sliders that control the values of four parameters k, ℓ, μ, and E.
Answer the following questions:

1. What is the physical/geometric meaning of each parameter k, ℓ, μ, E?
2. How does each parameter k, ℓ, μ, E affect the plot?
3. Which term in the effective potential $\left(-\frac{k}{r} \text{ or } \frac{\ell^2}{2\mu r^2} \right)$ dominates for small values of r? For large values of r? Explain in terms of both the equation and the graph.
4. What are the classical turning points? Under what conditions will the particle be bound? Unbound?
5. How do your answers for the last question change (if at all) if you consider a repulsive potential? Hint: Figure out what you must change in this notebook and investigate.