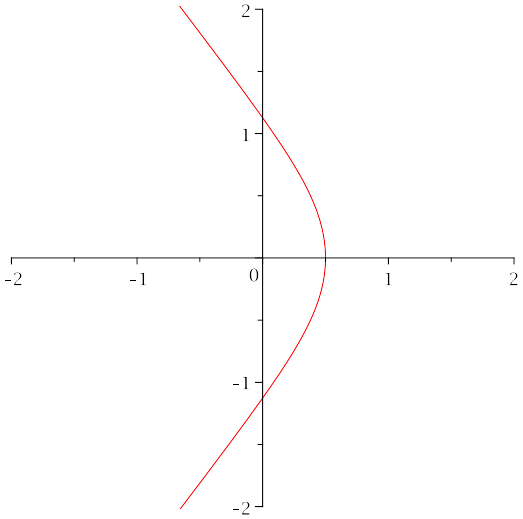
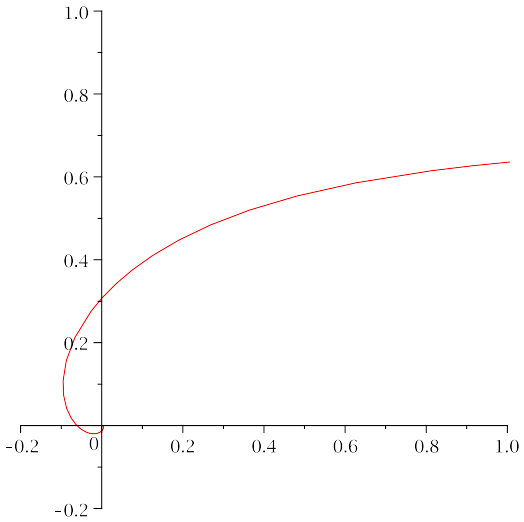
```
#
################################################################
# Maple-Worksheet zu Uebungsblatt 8, Aufgabe 2 (1/r^2-
Potential)
#
################################################################

restart:

A := L^2/(2*m) - alpha;

# c, (a)
s := sqrt(E/A) * sin((sqrt(2*m*A)/L)*phi + Pi/2);
plot(subs(L=1.0, m=1.0, alpha=0.25, E=1.0, phi0=0.0, 1/s), phi=
-2.0..+2.0, coords=polar,
  view=[-2.0..2.0,-2.0..2.0]);

# c, (b)
s := sqrt(-E/A) * sinh((sqrt(-2*m*A)/L)*phi);
plot(subs(L=1.0, m=1.0, alpha=1.0, E=1.0, phi0=0.0, 1/s), phi=
+0.25..+10.0, coords=polar,
  view=[-0.2..+1.0,-0.2..+1.0]);

# c, (c)
s := sqrt(E/A) * cosh((sqrt(-2*m*A)/L)*phi);
plot(subs(L=1.0, m=1.0, alpha=1.0, E=-1.0, phi0=0.0, 1/s), phi=
-10.0..+10.0, coords=polar,
  view=[-0.2..+0.8,-0.5..+0.5]);
```

$$A := \frac{1}{2}\frac{L^2}{m} - \alpha$$

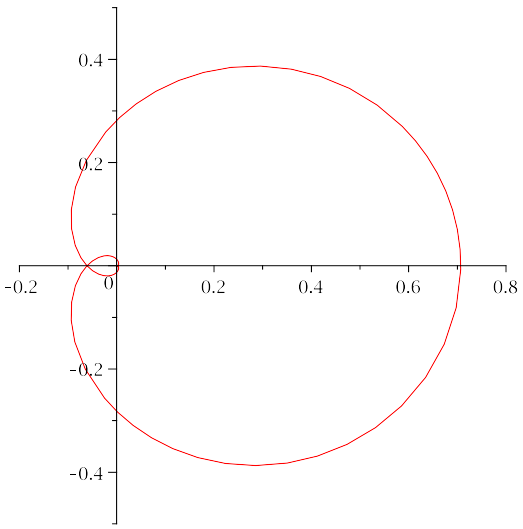
$$s := \sqrt{\frac{E}{\frac{1}{2}\frac{L^2}{m} - \alpha}}\,\cos\left(\frac{\sqrt{2}\sqrt{m\left(\frac{1}{2}\frac{L^2}{m} - \alpha\right)}\,\phi}{L}\right)$$



$$s := \sqrt{-\frac{E}{\frac{1}{2}\frac{L^2}{m} - \alpha}}\,\sinh\left(\frac{\sqrt{-2\,m\left(\frac{1}{2}\frac{L^2}{m} - \alpha\right)}\,\phi}{L}\right)$$



$$s := \sqrt{\frac{E}{\frac{1}{2}\frac{L^2}{m} - \alpha}}\,\cosh\left(\frac{\sqrt{-2\,m\left(\frac{1}{2}\frac{L^2}{m} - \alpha\right)}\,\phi}{L}\right)$$



>