```
$Assumptions=$Assumptions && {b>0}
v[x_]=v0 (x^2-1)

f[x_]= Exp[-b x^2]
ke=Integrate[f'[x]^2,{x,0,Infinity}]
n0a=Integrate[f[x]^2,{x,0,Infinity}]
pe=Integrate[v[x]f[x]^2,{x,0,1}]
e0a[v0_,b_]=(ke+pe)/n0a
Plot[e0a[25,b],{b,0,4}]
FindMinimum[e0a[25,b],{b,2.5}]
Out[11]= {-20.0075, {b -> 2.47561}}
f0a[x_]=f[x]/Sqrt[2 n0a] /. Last[%]

f[x_]=x Exp[-b x^2]
ke=Integrate[f'[x]^2,{x,0,Infinity}]
n1a=Integrate[f[x]^2,{x,0,Infinity}]
pe=Integrate[v[x]f[x]^2,{x,0,1}]
e1a[v0_,b_]=(ke+pe)/n1a
Plot[e1a[25,b],{b,0,4}]
FindMinimum[e1a[25,b],{b,2.5}]
Out[19]= {-10.1132, {b -> 2.38582}}
f1a[x_]=f[x]/Sqrt[2 n1a] /. Last[%]

f[x_]= Exp[-b x]
ke=Integrate[f'[x]^2,{x,0,Infinity}]
n0b=Integrate[f[x]^2,{x,0,Infinity}]
pe=Integrate[v[x]f[x]^2,{x,0,1}]
e0b[v0_,b_]=(ke+pe)/n0b
Plot[e0b[25,b],{b,0,4}]
FindMinimum[e0b[25,b],{b,2}]
Out[29]= {-18.42, {b -> 1.69328}}
f0b[x_]=f[Abs[x]]/Sqrt[2 n0b] /. Last[%]

Plot[{f0a[x],f0b[x]},{x,-2,2}]

f[x_]= x Exp[-b x]
ke=Integrate[f'[x]^2,{x,0,Infinity}]
n1b=Integrate[f[x]^2,{x,0,Infinity}]
pe=Integrate[v[x]f[x]^2,{x,0,1}]
e1b[v0_,b_]=(ke+pe)/n1b
Plot[e1b[25,b],{b,0,4}]
FindMinimum[e1b[25,b],{b,2.5}]
Out[40]= {-8.93326, {b -> 2.57363}}

f1b[x_]=x Exp[-b Abs[x]]/Sqrt[2 n1b] /. Last[%]

Plot[{f1a[x],f1b[x]},{x,-2,2}]

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f[x_]= Exp[-b x^2]

Plot[e0a[7.5,b],{b,0,4}]
FindMinimum[e0a[7.5,b],{b,1.5}]
Out[54]= {-4.81761, {b -> 1.24505}}
f0a[x_]=f[x]/Sqrt[2 n0a] /. Last[%]

f[x_]=x Exp[-b x^2]
Plot[e1a[7.5,b],{b,0,4}]
FindMinimum[e1a[7.5,b],{b,.5}]
Out[43]= {-0.062705, {b -> 0.750077}}
f1a[x_]=f[x]/Sqrt[2 n1a] /. Last[%]

f[x_]= Exp[-b x]
Plot[e0b[7.5,b],{b,0,4}]
FindMinimum[e0b[7.5,b],{b,1}]
Out[47]= {-4.29027, {b -> 1.0846}}
f0b[x_]=f[Abs[x]]/Sqrt[2 n0b] /. Last[%]

f[x_]= x Exp[-b x]
Plot[e1b[7.5,b],{b,0,4}]
FindMinimum[e1b[7.5,b],{b,1.5}]
Out[51]= {-0.291879, {b -> 1.25389}}
f1b[x_]=x Exp[-b Abs[x]]/Sqrt[2 n1b] /. Last[%]

Plot[{f1a[x],f1b[x]},{x,-2,2}]
Plot[{f0a[x],f0b[x]},{x,-2,2}]
```