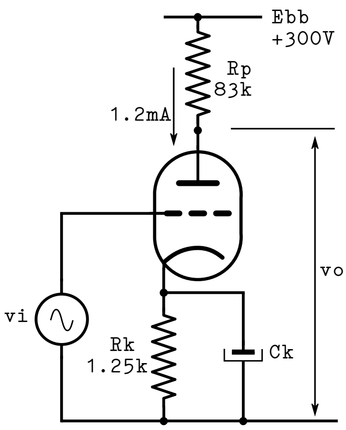
The easiest way is to do the calculating is using the "plate current vs plate voltage"- and the "plate current vs grid voltage"-characteristics and solve things graphically.
First you start what supply voltage you will use, lets say Ebb=300V and the plate working voltage Vp=200V
Then you decide, while examining the "plate current vs "grid voltage", what grid bias voltage is favourable having a linear as possible part of the characteristic:Vg-1.5V.
Now it is possible to draw both the Plate-load-line and the Cathode-bias-resistor line.
And then it is possible to calculate both the Rk and Rp:

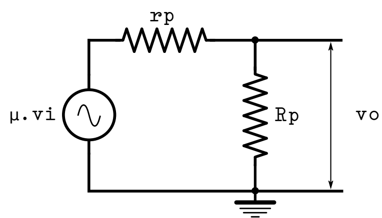
$$Rk = \frac{Vg}{Ip} = \frac{1.5\,V}{1.2\,mA} = 1.25\,k$$

$$Rp = \frac{\Delta Vp}{\Delta Ip} = \frac{100\,V}{1.2\,mA} = 83\,k$$

Now we can draw the circuit diagram to use this for the calculation of the small signal voltage gain:
Rk is decoupled with a sufficiently large capacitor.



Drawing the ac-equivalent circuit diagram for the plate-loop network of the triode (we use the quick calculation method described in this thread: https://www.diyaudio.com/forums/tubes-valves/38278-line-tube-learning-newbies-24.html post number #240)



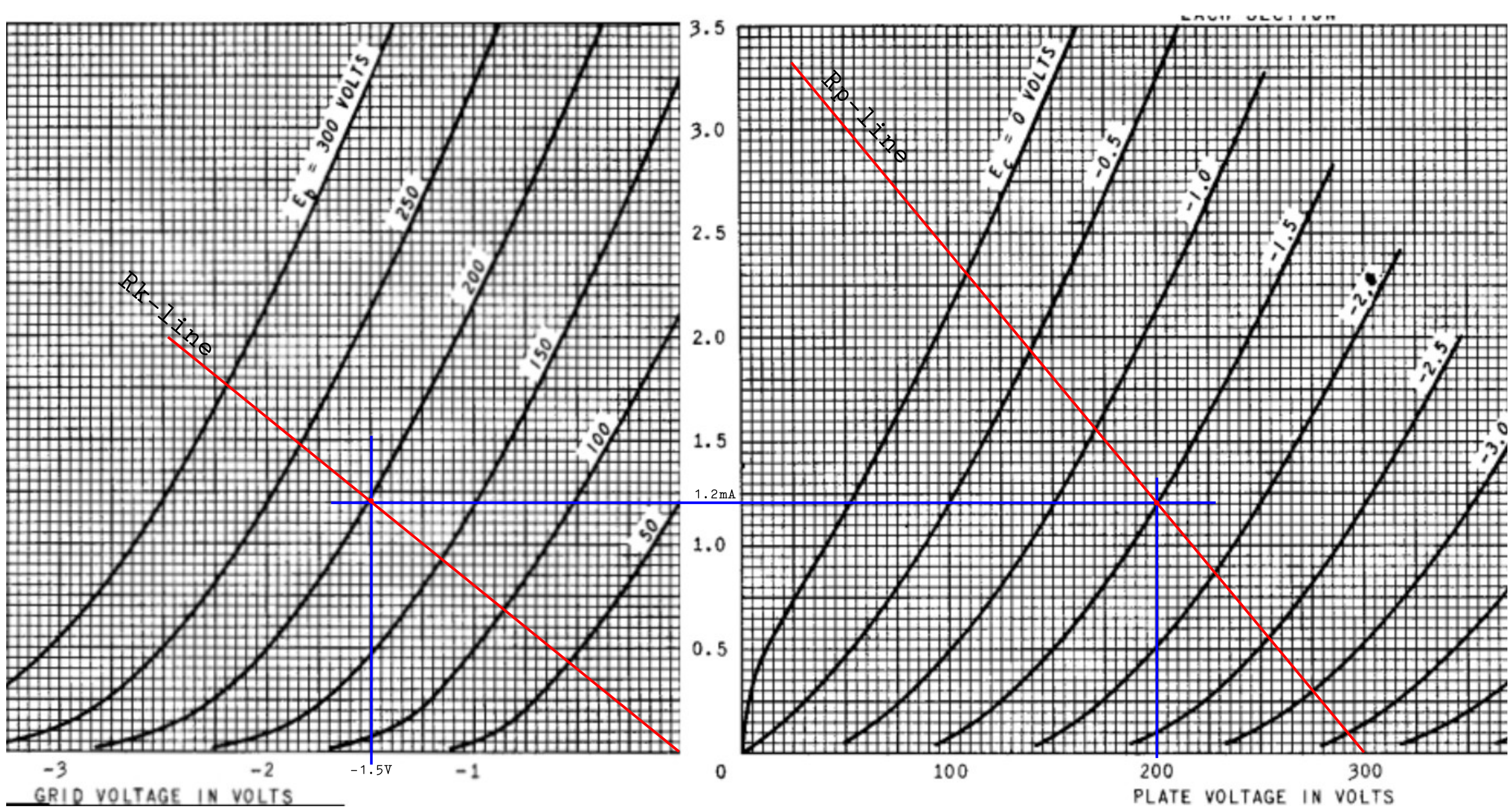
Where rp is the internal plate resistance of the triode and Rp is the load resistance used in the application.

$$vo = \frac{Rp}{rp + Rp} \cdot \mu \cdot vi$$

$$\frac{vo}{vi} = \frac{Rp}{rp + Rp} \cdot \mu$$

With Rp=83k and using the 12AX7 data sheet rp=62.5k and μ=100, it is now easy to calculate the small signal voltage gain of this triode gain stage.

$$\frac{vo}{vi} = \frac{83}{62.5 + 83} \cdot 100 = 57$$



Eb = 300 VOLTS
250
200
150
100
50
Rk-line
-3
-2
-1.5V
-1
GRID VOLTAGE IN VOLTS
3.5
3.0
2.5
2.0
1.5
1.2mA
1.0
0.5
0
Ec = 0 VOLTS
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
Rp-line
100
200
300
PLATE VOLTAGE IN VOLTS