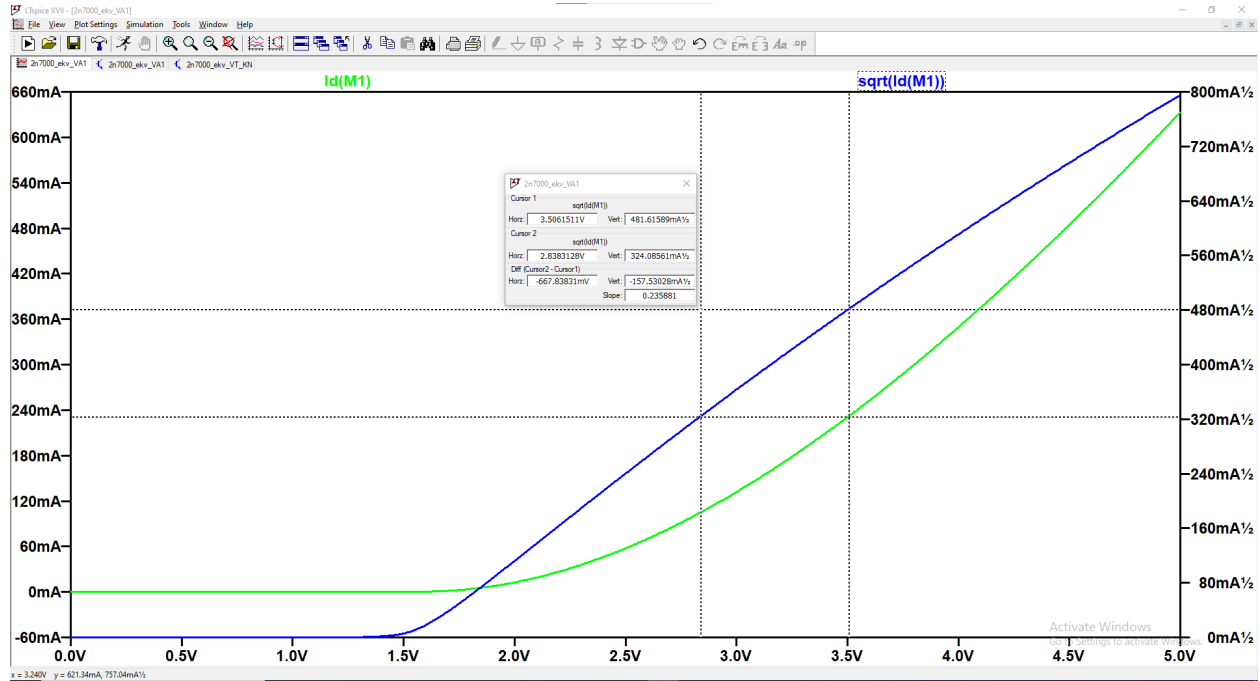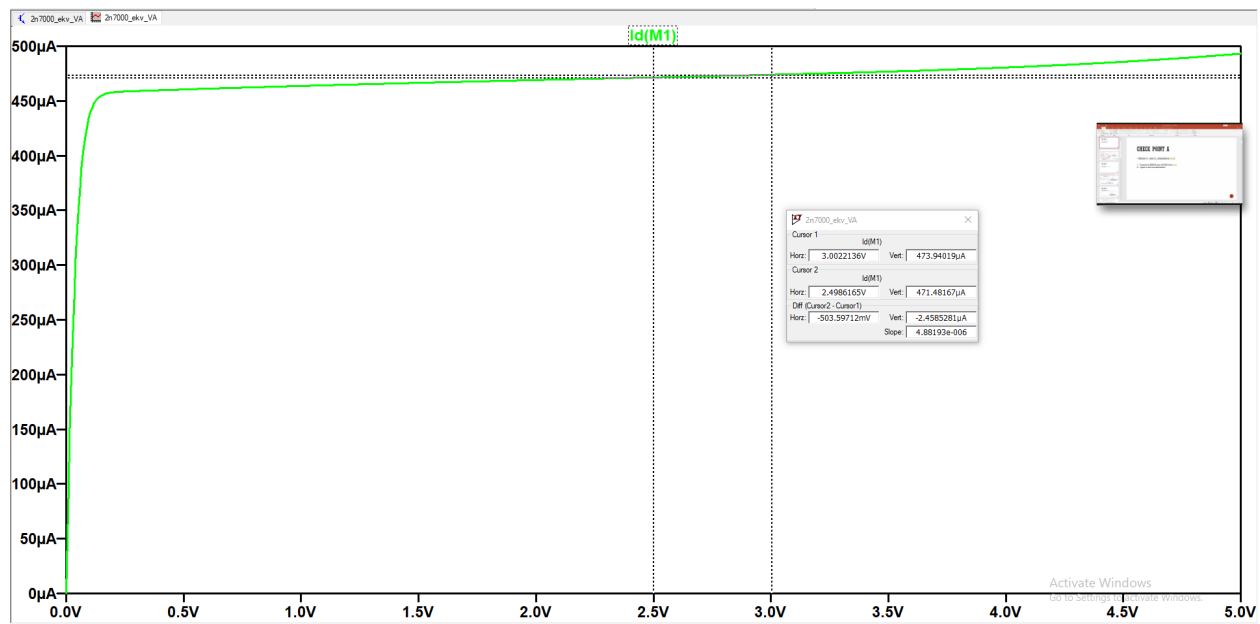Sorry it is a little basic professor, I have an exam right after this so I am going quickly! I think everything is here and correct.

A
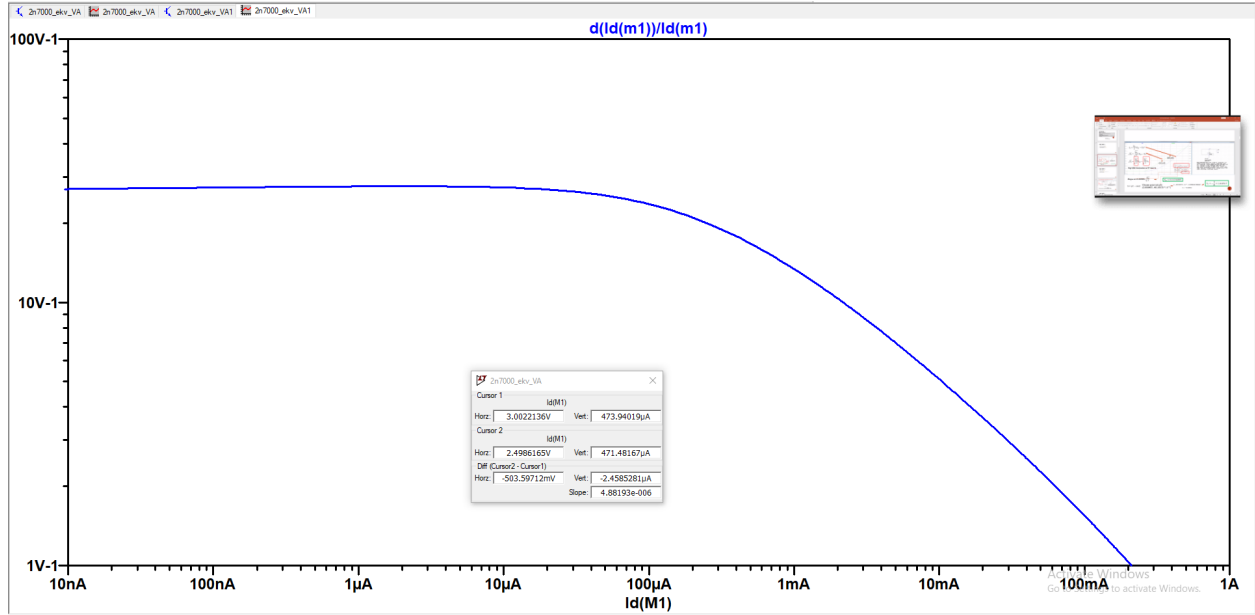

Kn= .111
Vt=1.465

B

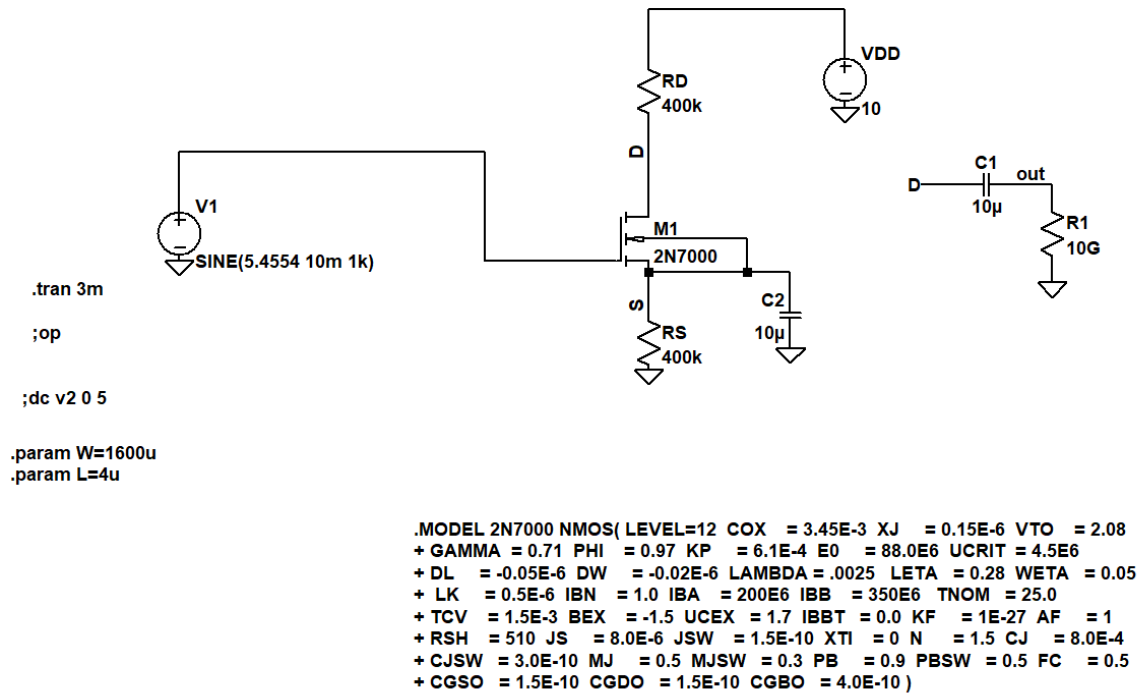Va=-b/m=3.002 - 4.739E-6/4.88E-6=-94.108

C

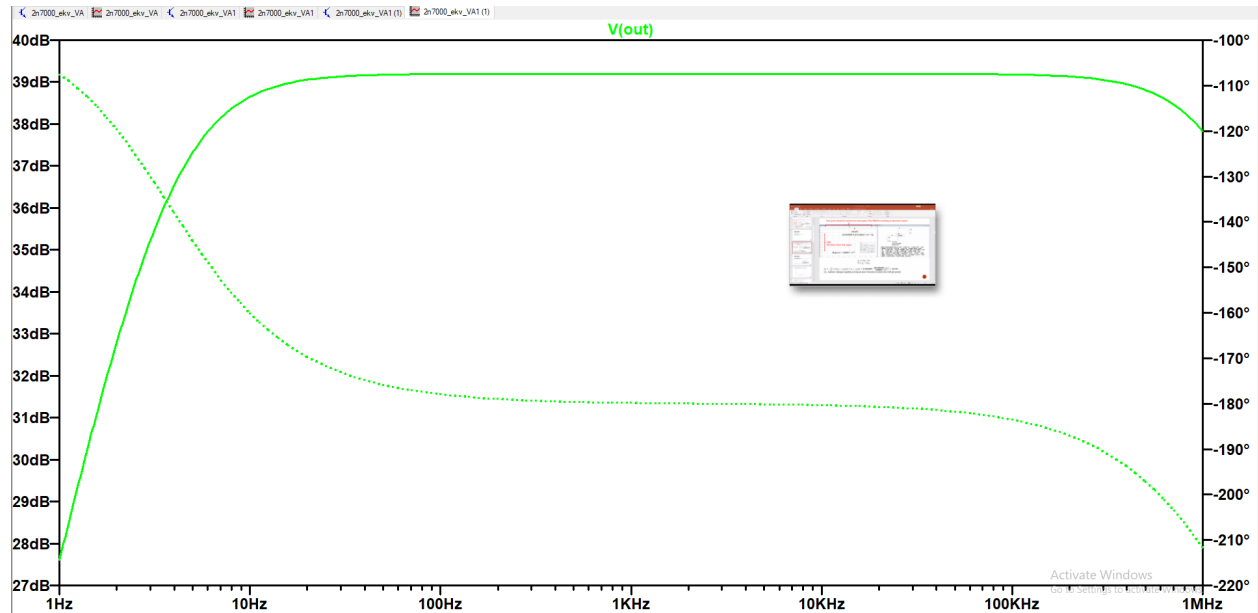**d(Id(m1))/Id(m1)**

2n7000_ekv_VA	✕

Cursor 1
	Id(M1)	
Horz:	3.0022136V	Vert:	473.94019µA

Cursor 2
	Id(M1)	
Horz:	2.4986165V	Vert:	471.48167µA

Diff (Cursor2 - Cursor1)
Horz:	-503.59712mV	Vert:	-2.4585281µA
		Slope:	4.88193e-006

100V-1

10V-1

1V-1

10nA   100nA   1µA   10µA   100µA   1mA   10mA   100mA   1A

Id(M1)

Activate Windows
Go to Settings to activate Windows.

D

RD
400k

VDD
10

V1
SINE(5.4554 10m 1k)

D

M1
2N7000

C1   out
10µ

D

R1
10G

S

RS
400k

C2
10µ

.tran 3m

;op

;dc v2 0 5

.param W=1600u
.param L=4u

.MODEL 2N7000 NMOS(LEVEL=12 COX   = 3.45E-3 XJ   = 0.15E-6 VTO   = 2.08
+ GAMMA = 0.71 PHI   = 0.97 KP   = 6.1E-4 E0   = 88.0E6 UCRIT = 4.5E6
+ DL   = -0.05E-6 DW   = -0.02E-6 LAMBDA = .0025 LETA = 0.28 WETA = 0.05
+ LK   = 0.5E-6 IBN   = 1.0 IBA   = 200E6 IBB   = 350E6 TNOM = 25.0
+ TCV   = 1.5E-3 BEX   = -1.5 UCEX = 1.7 IBBT = 0.0 KF   = 1E-27 AF   = 1
+ RSH   = 510 JS   = 8.0E-6 JSW   = 1.5E-10 XTI   = 0 N   = 1.5 CJ   = 8.0E-4
+ CJSW = 3.0E-10 MJ   = 0.5 MJSW = 0.3 PB   = 0.9 PBSW = 0.5 FC   = 0.5
+ CGSO = 1.5E-10 CGDO = 1.5E-10 CGBO = 4.0E-10)

Gain=20log(Vout/Vin)

V(out)

E

R1=R2 (Vdd-Vc)/V= (10-5.4554)/5.4554

R2= 83.3k

Rd= 400k *50/110 = 181.81k
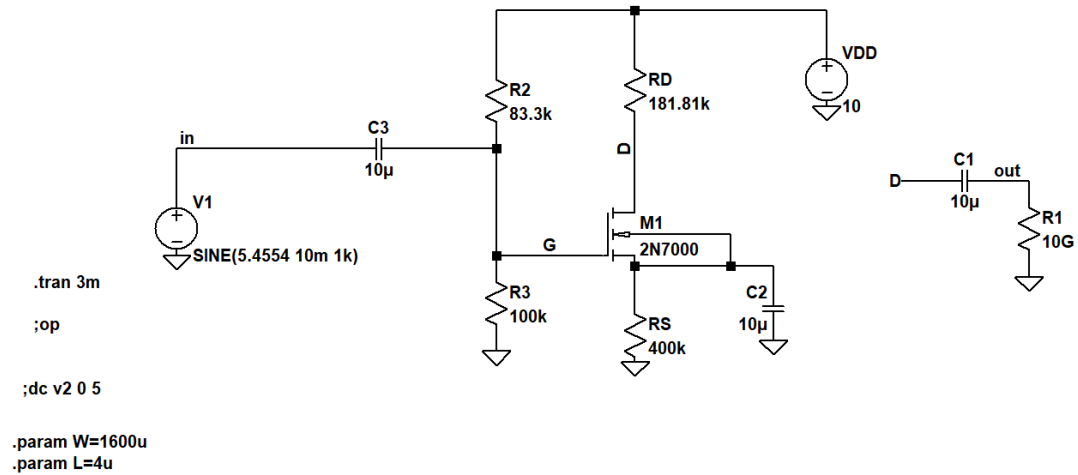
.tran 3m

;op

;dc v2 0 5
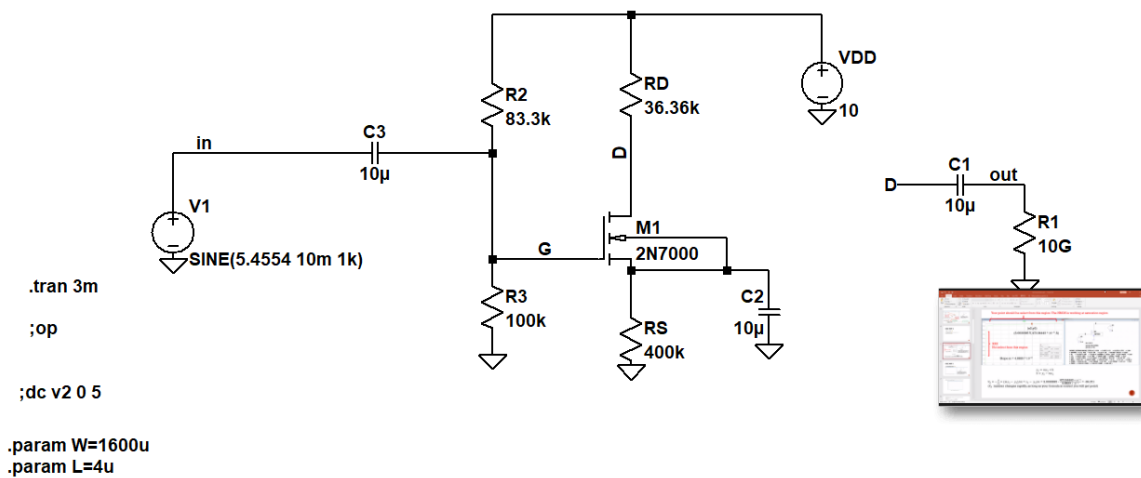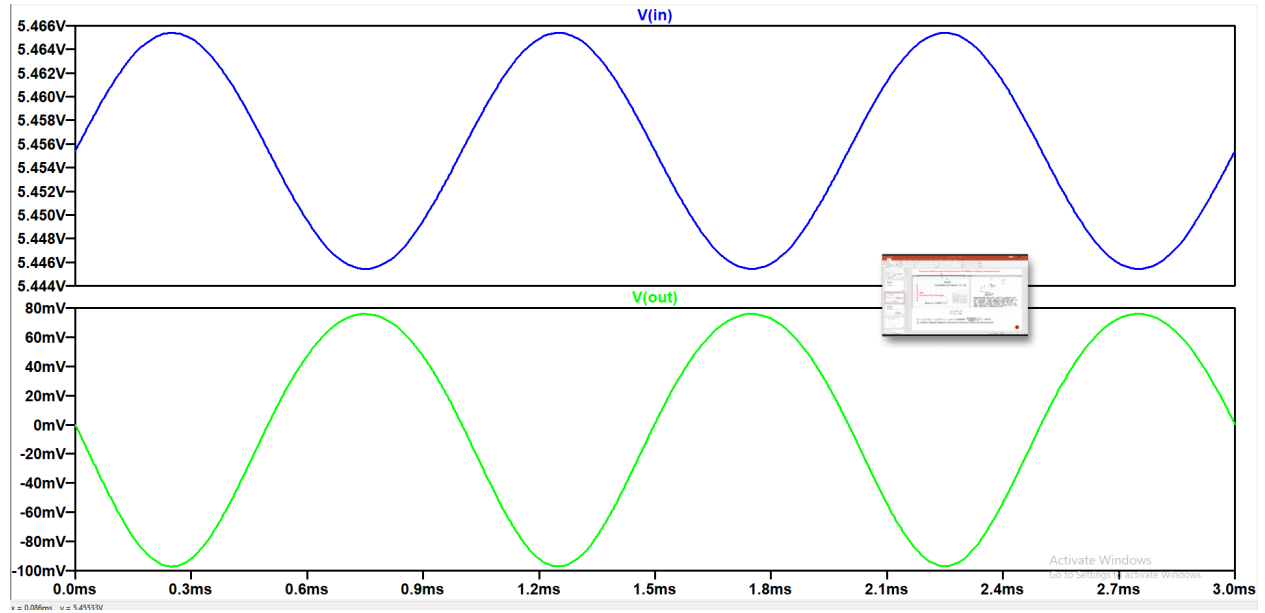
.param W=1600u
.param L=4u

.MODEL 2N7000 NMOS(LEVEL=12 COX   = 3.45E-3 XJ   = 0.15E-6 VTO   = 2.08
+ GAMMA = 0.71 PHI   = 0.97 KP   = 6.1E-4 E0   = 88.0E6 UCRIT = 4.5E6
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+ RSH   = 510 JS   = 8.0E-6 JSW   = 1.5E-10 XTI = 0 N   = 1.5 CJ   = 8.0E-4
+ CJSW = 3.0E-10 MJ   = 0.5 MJSW = 0.3 PB   = 0.9 PBSW = 0.5 FC   = 0.5
+ CGSO = 1.5E-10 CGDO = 1.5E-10 CGBO = 4.0E-10)

F

Rd= 400k *10/110 = 36.36k

V(in)

5.466V	
5.464V	
5.462V	
5.460V	
5.458V	
5.456V	
5.454V	
5.452V	
5.450V	
5.448V	
5.446V	
5.444V	

V(out)

80mV	
60mV	
40mV	
20mV	
0mV	
-20mV	
-40mV	
-60mV	
-80mV	
-100mV	

0.0ms 0.3ms 0.6ms 0.9ms 1.2ms 1.5ms 1.8ms 2.1ms 2.4ms 2.7ms 3.0ms

x = 0.086ms   y = 5.45533V

R2 83.3k
RD 36.36k
VDD 10
in
C3 10µ
D
V1
SINE(5.4554 10m 1k)
G
M1 2N7000
R3 100k
RS 400k
C2 10µ
C1 10µ
out
D
R1 10G

.tran 3m

;op

;dc v2 0 5

.param W=1600u
.param L=4u

.MODEL 2N7000 NMOS(LEVEL=12 COX   = 3.45E-3 XJ   = 0.15E-6 VTO   = 2.08
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+ RSH   = 510 JS   = 8.0E-6 JSW   = 1.5E-10 XTI   = 0 N   = 1.5 CJ   = 8.0E-4
+ CJSW = 3.0E-10 MJ   = 0.5 MJSW = 0.3 PB   = 0.9 PBSW = 0.5 FC   = 0.5
+ CGSO = 1.5E-10 CGDO = 1.5E-10 CGBO = 4.0E-10)