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MECHANICAL ENGINEERING
16/ENG06/019
ENG 281

QUESTION 4A

Program window

```
commandwindow  
clear  
clc  
close all  
A=[0,10,4,-2;-3,-17,1,2;1,1,1,0;8,-34,16,-10]  
b=[-4;2;6;4]  
x=inv(A)*b
```

Command window

A =

```
0 10 4 -2  
-3 -17 1 2  
1 1 1 0  
8 -34 16 -10
```

b =

```
-4  
2  
6  
4
```

x =

4.0000

-0.0000

2.0000

6.0000

QUESTION 4b

Program window

```
commandwindow
clear
clc
close all
syms t
d=1.5*exp(-0.75*t)*sin(0.85*t)+0.375*t
tn=[0:0.01:2.5]
dn=subs(d,tn)
figure(1)
plot(tn,dn)
xlabel('Time(min)')
ylabel('Distance(m)')
axis tight
grid on
grid minor
v=diff(d)
vn=subs(v,tn)
figure(2)
plot(tn,vn)
xlabel('Time(min)')
ylabel('Velocity(m/min)')
grid on
grid minor
axis tight
a=diff(v)
an=subs(a,tn)
figure(3)
plot(tn,an)
xlabel('Time(min)')
ylabel('Acceleration(m/min^2)')
grid on
grid minor
axis tight
figure(4)
plot(tn,dn,tn,vn,tn,an)
xlabel('Time(min)')
ylabel('Variable')
axis tight
grid on
grid minor
legend('Distance(m)', 'Velocity(m/min)', 'Acceleration(m/min^2)')
```

Command window

d =

$$(3*t)/8 + (3*\sin((17*t)/20)*\exp(-(3*t)/4))/2$$

tn =

Columns 1 through 7

0 0.0100 0.0200 0.0300 0.0400 0.0500 0.0600

Columns 8 through 14

0.0700 0.0800 0.0900 0.1000 0.1100 0.1200 0.1300

Columns 15 through 21

0.1400 0.1500 0.1600 0.1700 0.1800 0.1900 0.2000

Columns 22 through 28

0.2100 0.2200 0.2300 0.2400 0.2500 0.2600 0.2700

Columns 29 through 35

0.2800 0.2900 0.3000 0.3100 0.3200 0.3300 0.3400

Columns 36 through 42

0.3500 0.3600 0.3700 0.3800 0.3900 0.4000 0.4100

Columns 43 through 49

0.4200 0.4300 0.4400 0.4500 0.4600 0.4700 0.4800

Columns 50 through 56

0.4900 0.5000 0.5100 0.5200 0.5300 0.5400 0.5500

Columns 57 through 63

0.5600 0.5700 0.5800 0.5900 0.6000 0.6100 0.6200

Columns 64 through 70

0.6300 0.6400 0.6500 0.6600 0.6700 0.6800 0.6900

Columns 71 through 77

0.7000 0.7100 0.7200 0.7300 0.7400 0.7500 0.7600

Columns 78 through 84

0.7700 0.7800 0.7900 0.8000 0.8100 0.8200 0.8300

Columns 85 through 91

0.8400 0.8500 0.8600 0.8700 0.8800 0.8900 0.9000

Columns 92 through 98

0.9100 0.9200 0.9300 0.9400 0.9500 0.9600 0.9700

Columns 99 through 105

0.9800 0.9900 1.0000 1.0100 1.0200 1.0300 1.0400

Columns 106 through 112

1.0500 1.0600 1.0700 1.0800 1.0900 1.1000 1.1100

Columns 113 through 119

1.1200 1.1300 1.1400 1.1500 1.1600 1.1700 1.1800

Columns 120 through 126

1.1900 1.2000 1.2100 1.2200 1.2300 1.2400 1.2500

Columns 127 through 133

1.2600 1.2700 1.2800 1.2900 1.3000 1.3100 1.3200

Columns 134 through 140

1.3300 1.3400 1.3500 1.3600 1.3700 1.3800 1.3900

Columns 141 through 147

1.4000 1.4100 1.4200 1.4300 1.4400 1.4500 1.4600

Columns 148 through 154

1.4700 1.4800 1.4900 1.5000 1.5100 1.5200 1.5300

Columns 155 through 161

1.5400 1.5500 1.5600 1.5700 1.5800 1.5900 1.6000

Columns 162 through 168

1.6100 1.6200 1.6300 1.6400 1.6500 1.6600 1.6700

Columns 169 through 175

1.6800 1.6900 1.7000 1.7100 1.7200 1.7300 1.7400

Columns 176 through 182

1.7500 1.7600 1.7700 1.7800 1.7900 1.8000 1.8100

Columns 183 through 189

1.8200 1.8300 1.8400 1.8500 1.8600 1.8700 1.8800

Columns 190 through 196

1.8900 1.9000 1.9100 1.9200 1.9300 1.9400 1.9500

Columns 197 through 203

1.9600 1.9700 1.9800 1.9900 2.0000 2.0100 2.0200

Columns 204 through 210

2.0300 2.0400 2.0500 2.0600 2.0700 2.0800 2.0900

Columns 211 through 217

2.1000 2.1100 2.1200 2.1300 2.1400 2.1500 2.1600

Columns 218 through 224

2.1700 2.1800 2.1900 2.2000 2.2100 2.2200 2.2300

Columns 225 through 231

2.2400 2.2500 2.2600 2.2700 2.2800 2.2900 2.3000

Columns 232 through 238

2.3100 2.3200 2.3300 2.3400 2.3500 2.3600 2.3700

Columns 239 through 245

2.3800 2.3900 2.4000 2.4100 2.4200 2.4300 2.4400

Columns 246 through 251

2.4500 2.4600 2.4700 2.4800 2.4900 2.5000

dn =

[0, (3*exp(-3/400)*sin(17/2000))/2 + 3/800, (3*exp(-3/200)*sin(17/1000))/2 + 3/400, (3*exp(-9/400)*sin(51/2000))/2 + 9/800, (3*exp(-3/100)*sin(17/500))/2 + 3/200, (3*exp(-3/80)*sin(17/400))/2 + 3/160, (3*exp(-9/200)*sin(51/1000))/2 + 9/400, (3*exp(-21/400)*sin(119/2000))/2 + 21/800, (3*exp(-3/50)*sin(17/250))/2 + 3/100, (3*exp(-27/400)*sin(153/2000))/2 + 27/800, (3*exp(-3/40)*sin(17/200))/2 + 3/80, (3*exp(-33/400)*sin(187/2000))/2 + 33/800, (3*exp(-9/100)*sin(51/500))/2 + 9/200, (3*exp(-39/400)*sin(221/2000))/2 + 39/800, (3*exp(-21/200)*sin(119/1000))/2 + 21/400, (3*exp(-9/80)*sin(51/400))/2 + 9/160, (3*exp(-3/25)*sin(17/125))/2 + 3/50, (3*exp(-51/400)*sin(289/2000))/2 + 51/800, (3*exp(-27/200)*sin(153/1000))/2 + 27/400, (3*exp(-57/400)*sin(323/2000))/2 + 57/800, (3*exp(-3/20)*sin(17/100))/2 + 3/40, (3*exp(-63/400)*sin(357/2000))/2 + 63/800, (3*exp(-33/200)*sin(187/1000))/2 + 33/400, (3*exp(-69/400)*sin(391/2000))/2 + 69/800, (3*exp(-9/50)*sin(51/250))/2 + 9/100, (3*exp(-3/16)*sin(17/80))/2 + 3/32, (3*exp(-39/200)*sin(221/1000))/2 + 39/400, (3*exp(-81/400)*sin(459/2000))/2 + 81/800, (3*exp(-21/100)*sin(119/500))/2 + 21/200, (3*exp(-87/400)*sin(493/2000))/2 + 87/800, (3*exp(-9/40)*sin(51/200))/2 + 9/80, (3*exp(-93/400)*sin(527/2000))/2 + 93/800, (3*exp(-6/25)*sin(34/125))/2 + 3/25, (3*exp(-99/400)*sin(561/2000))/2 + 99/800, (3*exp(-51/200)*sin(289/1000))/2 + 51/400, (3*exp(-21/80)*sin(119/400))/2 + 21/160, (3*exp(-27/100)*sin(153/500))/2 + 27/200, (3*exp(-111/400)*sin(629/2000))/2 + 111/800, (3*exp(-57/200)*sin(323/1000))/2 + 57/400, (3*exp(-117/400)*sin(663/2000))/2 + 117/800, (3*exp(-3/10)*sin(17/50))/2 + 3/20, (3*exp(-123/400)*sin(697/2000))/2 + 123/800, (3*exp(-63/200)*sin(357/1000))/2 + 63/400, (3*exp(-129/400)*sin(731/2000))/2 + 129/800, (3*exp(-33/100)*sin(187/500))/2 + 33/200, (3*exp(-27/80)*sin(153/400))/2 + 27/160, (3*exp(-69/200)*sin(391/1000))/2 + 69/400, (3*exp(-141/400)*sin(799/2000))/2 + 141/800, (3*exp(-9/25)*sin(51/125))/2 + 9/50, (3*exp(-

$147/400 * \sin(833/2000))/2 + 147/800, (3 * \exp(-3/8) * \sin(17/40))/2 + 3/16, (3 * \exp(-153/400) * \sin(867/2000))/2 + 153/800, (3 * \exp(-39/100) * \sin(221/500))/2 + 39/200, (3 * \exp(-159/400) * \sin(901/2000))/2 + 159/800, (3 * \exp(-81/200) * \sin(459/1000))/2 + 81/400, (3 * \exp(-33/80) * \sin(187/400))/2 + 33/160, (3 * \exp(-21/50) * \sin(119/250))/2 + 21/100, (3 * \exp(-171/400) * \sin(969/2000))/2 + 171/800, (3 * \exp(-87/200) * \sin(493/1000))/2 + 87/400, (3 * \exp(-177/400) * \sin(1003/2000))/2 + 177/800, (3 * \exp(-9/20) * \sin(51/100))/2 + 9/40, (3 * \exp(-183/400) * \sin(1037/2000))/2 + 183/800, (3 * \exp(-93/200) * \sin(527/1000))/2 + 93/400, (3 * \exp(-189/400) * \sin(1071/2000))/2 + 189/800, (3 * \exp(-12/25) * \sin(68/125))/2 + 6/25, (3 * \exp(-39/80) * \sin(221/400))/2 + 39/160, (3 * \exp(-99/200) * \sin(561/1000))/2 + 99/400, (3 * \exp(-201/400) * \sin(1139/2000))/2 + 201/800, (3 * \exp(-51/100) * \sin(289/500))/2 + 51/200, (3 * \exp(-207/400) * \sin(1173/2000))/2 + 207/800, (3 * \exp(-21/40) * \sin(119/200))/2 + 21/80, (3 * \exp(-213/400) * \sin(1207/2000))/2 + 213/800, (3 * \exp(-27/50) * \sin(153/250))/2 + 27/100, (3 * \exp(-219/400) * \sin(1241/2000))/2 + 219/800, (3 * \exp(-111/200) * \sin(629/1000))/2 + 111/400, (3 * \exp(-9/16) * \sin(51/80))/2 + 9/32, (3 * \exp(-57/100) * \sin(323/500))/2 + 57/200, (3 * \exp(-231/400) * \sin(1309/2000))/2 + 231/800, (3 * \exp(-117/200) * \sin(663/1000))/2 + 117/400, (3 * \exp(-237/400) * \sin(1343/2000))/2 + 237/800, (3 * \exp(-3/5) * \sin(17/25))/2 + 3/10, (3 * \exp(-243/400) * \sin(1377/2000))/2 + 243/800, (3 * \exp(-123/200) * \sin(697/1000))/2 + 123/400, (3 * \exp(-249/400) * \sin(1411/2000))/2 + 249/800, (3 * \exp(-63/100) * \sin(357/500))/2 + 63/200, (3 * \exp(-51/80) * \sin(289/400))/2 + 51/160, (3 * \exp(-129/200) * \sin(731/1000))/2 + 129/400, (3 * \exp(-261/400) * \sin(1479/2000))/2 + 261/800, (3 * \exp(-33/50) * \sin(187/250))/2 + 33/100, (3 * \exp(-267/400) * \sin(1513/2000))/2 + 267/800, (3 * \exp(-27/40) * \sin(153/200))/2 + 27/80, (3 * \exp(-273/400) * \sin(1547/2000))/2 + 273/800, (3 * \exp(-69/100) * \sin(391/500))/2 + 69/200, (3 * \exp(-279/400) * \sin(1581/2000))/2 + 279/800, (3 * \exp(-141/200) * \sin(799/1000))/2 + 141/400, (3 * \exp(-57/80) * \sin(323/400))/2 + 57/160, (3 * \exp(-18/25) * \sin(102/125))/2 + 9/25, (3 * \exp(-291/400) * \sin(1649/2000))/2 + 291/800, (3 * \exp(-147/200) * \sin(833/1000))/2 + 147/400, (3 * \exp(-297/400) * \sin(1683/2000))/2 + 297/800, (3 * \exp(-3/4) * \sin(17/20))/2 + 3/8, (3 * \exp(-303/400) * \sin(1717/2000))/2 + 303/800, (3 * \exp(-153/200) * \sin(867/1000))/2 + 153/400, (3 * \exp(-309/400) * \sin(1751/2000))/2 + 309/800, (3 * \exp(-39/50) * \sin(221/250))/2 + 39/100, (3 * \exp(-63/80) * \sin(357/400))/2 + 63/160, (3 * \exp(-159/200) * \sin(901/1000))/2 + 159/400, (3 * \exp(-321/400) * \sin(1819/2000))/2 + 321/800, (3 * \exp(-81/100) * \sin(459/500))/2 + 81/200, (3 * \exp(-327/400) * \sin(1853/2000))/2 + 327/800, (3 * \exp(-33/40) * \sin(187/200))/2 + 33/80, (3 * \exp(-333/400) * \sin(1887/2000))/2 + 333/800, (3 * \exp(-21/25) * \sin(119/125))/2 + 21/50, (3 * \exp(-339/400) * \sin(1921/2000))/2 + 339/800, (3 * \exp(-171/200) * \sin(969/1000))/2 + 171/400, (3 * \exp(-69/80) * \sin(391/400))/2 + 69/160, (3 * \exp(-87/100) * \sin(493/500))/2 + 87/200, (3 * \exp(-351/400) * \sin(1989/2000))/2 + 351/800, (3 * \exp(-177/200) * \sin(1003/1000))/2 + 177/400, (3 * \exp(-357/400) * \sin(2023/2000))/2 + 357/800, (3 * \exp(-9/10) * \sin(51/50))/2 + 9/20, (3 * \exp(-363/400) * \sin(2057/2000))/2 + 363/800, (3 * \exp(-183/200) * \sin(1037/1000))/2 + 183/400, (3 * \exp(-369/400) * \sin(2091/2000))/2 + 369/800, (3 * \exp(-93/100) * \sin(527/500))/2 + 93/200, (3 * \exp(-15/16) * \sin(17/16))/2 + 15/32, (3 * \exp(-189/200) * \sin(1071/1000))/2 + 189/400, (3 * \exp(-381/400) * \sin(2159/2000))/2 + 381/800, (3 * \exp(-24/25) * \sin(136/125))/2 + 12/25, (3 * \exp(-387/400) * \sin(2193/2000))/2 + 387/800, (3 * \exp(-39/40) * \sin(221/200))/2 + 39/80, (3 * \exp(-393/400) * \sin(2227/2000))/2 + 393/800, (3 * \exp(-99/100) * \sin(561/500))/2 + 99/200, (3 * \exp(-399/400) * \sin(2261/2000))/2 + 399/800, (3 * \exp(-201/200) * \sin(1139/1000))/2 + 201/400, (3 * \exp(-81/80) * \sin(459/400))/2 + 81/160, (3 * \exp(-51/50) * \sin(289/250))/2 + 51/100, (3 * \exp(-$

$411/400 * \sin(2329/2000))/2 + 411/800, (3 * \exp(-207/200) * \sin(1173/1000))/2 + 207/400, (3 * \exp(-417/400) * \sin(2363/2000))/2 + 417/800, (3 * \exp(-21/20) * \sin(119/100))/2 + 21/40, (3 * \exp(-423/400) * \sin(2397/2000))/2 + 423/800, (3 * \exp(-213/200) * \sin(1207/1000))/2 + 213/400, (3 * \exp(-429/400) * \sin(2431/2000))/2 + 429/800, (3 * \exp(-27/25) * \sin(153/125))/2 + 27/50, (3 * \exp(-87/80) * \sin(493/400))/2 + 87/160, (3 * \exp(-219/200) * \sin(1241/1000))/2 + 219/400, (3 * \exp(-441/400) * \sin(2499/2000))/2 + 441/800, (3 * \exp(-111/100) * \sin(629/500))/2 + 111/200, (3 * \exp(-447/400) * \sin(2533/2000))/2 + 447/800, (3 * \exp(-9/8) * \sin(51/40))/2 + 9/16, (3 * \exp(-453/400) * \sin(2567/2000))/2 + 453/800, (3 * \exp(-57/50) * \sin(323/250))/2 + 57/100, (3 * \exp(-459/400) * \sin(2601/2000))/2 + 459/800, (3 * \exp(-231/200) * \sin(1309/1000))/2 + 231/400, (3 * \exp(-93/80) * \sin(527/400))/2 + 93/160, (3 * \exp(-117/100) * \sin(663/500))/2 + 117/200, (3 * \exp(-471/400) * \sin(2669/2000))/2 + 471/800, (3 * \exp(-237/200) * \sin(1343/1000))/2 + 237/400, (3 * \exp(-477/400) * \sin(2703/2000))/2 + 477/800, (3 * \exp(-6/5) * \sin(34/25))/2 + 3/5, (3 * \exp(-483/400) * \sin(2737/2000))/2 + 483/800, (3 * \exp(-243/200) * \sin(1377/1000))/2 + 243/400, (3 * \exp(-489/400) * \sin(2771/2000))/2 + 489/800, (3 * \exp(-123/100) * \sin(697/500))/2 + 123/200, (3 * \exp(-99/80) * \sin(561/400))/2 + 99/160, (3 * \exp(-249/200) * \sin(1411/1000))/2 + 249/400, (3 * \exp(-501/400) * \sin(2839/2000))/2 + 501/800, (3 * \exp(-63/50) * \sin(357/250))/2 + 63/100, (3 * \exp(-507/400) * \sin(2873/2000))/2 + 507/800, (3 * \exp(-51/40) * \sin(289/200))/2 + 51/80, (3 * \exp(-513/400) * \sin(2907/2000))/2 + 513/800, (3 * \exp(-129/100) * \sin(731/500))/2 + 129/200, (3 * \exp(-519/400) * \sin(2941/2000))/2 + 519/800, (3 * \exp(-261/200) * \sin(1479/1000))/2 + 261/400, (3 * \exp(-21/16) * \sin(119/80))/2 + 21/32, (3 * \exp(-33/25) * \sin(187/125))/2 + 33/50, (3 * \exp(-531/400) * \sin(3009/2000))/2 + 531/800, (3 * \exp(-267/200) * \sin(1513/1000))/2 + 267/400, (3 * \exp(-537/400) * \sin(3043/2000))/2 + 537/800, (3 * \exp(-27/20) * \sin(153/100))/2 + 27/40, (3 * \exp(-543/400) * \sin(3077/2000))/2 + 543/800, (3 * \exp(-273/200) * \sin(1547/1000))/2 + 273/400, (3 * \exp(-549/400) * \sin(3111/2000))/2 + 549/800, (3 * \exp(-69/50) * \sin(391/250))/2 + 69/100, (3 * \exp(-111/80) * \sin(629/400))/2 + 111/160, (3 * \exp(-279/200) * \sin(1581/1000))/2 + 279/400, (3 * \exp(-561/400) * \sin(3179/2000))/2 + 561/800, (3 * \exp(-141/100) * \sin(799/500))/2 + 141/200, (3 * \exp(-567/400) * \sin(3213/2000))/2 + 567/800, (3 * \exp(-57/40) * \sin(323/200))/2 + 57/80, (3 * \exp(-573/400) * \sin(3247/2000))/2 + 573/800, (3 * \exp(-36/25) * \sin(204/125))/2 + 18/25, (3 * \exp(-579/400) * \sin(3281/2000))/2 + 579/800, (3 * \exp(-291/200) * \sin(1649/1000))/2 + 291/400, (3 * \exp(-117/80) * \sin(663/400))/2 + 117/160, (3 * \exp(-147/100) * \sin(833/500))/2 + 147/200, (3 * \exp(-591/400) * \sin(3349/2000))/2 + 591/800, (3 * \exp(-297/200) * \sin(1683/1000))/2 + 297/400, (3 * \exp(-597/400) * \sin(3383/2000))/2 + 597/800, (3 * \exp(-3/2) * \sin(17/10))/2 + 3/4, (3 * \exp(-603/400) * \sin(3417/2000))/2 + 603/800, (3 * \exp(-303/200) * \sin(1717/1000))/2 + 303/400, (3 * \exp(-609/400) * \sin(3451/2000))/2 + 609/800, (3 * \exp(-153/100) * \sin(867/500))/2 + 153/200, (3 * \exp(-123/80) * \sin(697/400))/2 + 123/160, (3 * \exp(-309/200) * \sin(1751/1000))/2 + 309/400, (3 * \exp(-621/400) * \sin(3519/2000))/2 + 621/800, (3 * \exp(-39/25) * \sin(221/125))/2 + 39/50, (3 * \exp(-627/400) * \sin(3553/2000))/2 + 627/800, (3 * \exp(-63/40) * \sin(357/200))/2 + 63/80, (3 * \exp(-633/400) * \sin(3587/2000))/2 + 633/800, (3 * \exp(-159/100) * \sin(901/500))/2 + 159/200, (3 * \exp(-639/400) * \sin(3621/2000))/2 + 639/800, (3 * \exp(-321/200) * \sin(1819/1000))/2 + 321/400, (3 * \exp(-129/80) * \sin(731/400))/2 + 129/160, (3 * \exp(-81/50) * \sin(459/250))/2 + 81/100, (3 * \exp(-651/400) * \sin(3689/2000))/2 + 651/800, (3 * \exp(-327/200) * \sin(1853/1000))/2 + 327/400, (3 * \exp(-657/400) * \sin(3723/2000))/2 + 657/800, (3 * \exp(-33/20) * \sin(187/100))/2 + 33/40, (3 * \exp(-663/400) * \sin(3757/2000))/2 + 663/800, (3 * \exp(-333/200) * \sin(1887/1000))/2 + 333/400, (3 * \exp(-669/400) * \sin(3791/2000))/2 + 669/800, (3 * \exp(-42/25) * \sin(238/125))/2 + 21/25, (3 * \exp(-$

$27/16) * \sin(153/80))/2 + 27/32, (3 * \exp(-339/200) * \sin(1921/1000))/2 + 339/400, (3 * \exp(-681/400) * \sin(3859/2000))/2 + 681/800, (3 * \exp(-171/100) * \sin(969/500))/2 + 171/200, (3 * \exp(-687/400) * \sin(3893/2000))/2 + 687/800, (3 * \exp(-69/40) * \sin(391/200))/2 + 69/80, (3 * \exp(-693/400) * \sin(3927/2000))/2 + 693/800, (3 * \exp(-87/50) * \sin(493/250))/2 + 87/100, (3 * \exp(-699/400) * \sin(3961/2000))/2 + 699/800, (3 * \exp(-351/200) * \sin(1989/1000))/2 + 351/400, (3 * \exp(-141/80) * \sin(799/400))/2 + 141/160, (3 * \exp(-177/100) * \sin(1003/500))/2 + 177/200, (3 * \exp(-711/400) * \sin(4029/2000))/2 + 711/800, (3 * \exp(-357/200) * \sin(2023/1000))/2 + 357/400, (3 * \exp(-717/400) * \sin(4063/2000))/2 + 717/800, (3 * \exp(-9/5) * \sin(51/25))/2 + 9/10, (3 * \exp(-723/400) * \sin(4097/2000))/2 + 723/800, (3 * \exp(-363/200) * \sin(2057/1000))/2 + 363/400, (3 * \exp(-729/400) * \sin(4131/2000))/2 + 729/800, (3 * \exp(-183/100) * \sin(1037/500))/2 + 183/200, (3 * \exp(-147/80) * \sin(833/400))/2 + 147/160, (3 * \exp(-369/200) * \sin(2091/1000))/2 + 369/400, (3 * \exp(-741/400) * \sin(4199/2000))/2 + 741/800, (3 * \exp(-93/50) * \sin(527/250))/2 + 93/100, (3 * \exp(-747/400) * \sin(4233/2000))/2 + 747/800, (3 * \exp(-15/8) * \sin(17/8))/2 + 15/16]$

v =

$$(51 * \cos((17*t)/20) * \exp(-(3*t)/4))/40 - (9 * \sin((17*t)/20) * \exp(-(3*t)/4))/8 + 3/8$$

vn =

$$\begin{aligned}
 & [33/20, (51 * \cos(17/2000) * \exp(-3/400))/40 - (9 * \exp(-3/400) * \sin(17/2000))/8 + 3/8, \\
 & (51 * \cos(17/1000) * \exp(-3/200))/40 - (9 * \exp(-3/200) * \sin(17/1000))/8 + 3/8, (51 * \cos(51/2000) * \exp(-9/400))/40 - (9 * \exp(-9/400) * \sin(51/2000))/8 + 3/8, (51 * \cos(17/500) * \exp(-3/100))/40 - (9 * \exp(-3/100) * \sin(17/500))/8 + 3/8, \\
 & (51 * \cos(17/400) * \exp(-3/80))/40 - (9 * \exp(-3/80) * \sin(17/400))/8 + 3/8, (51 * \cos(51/1000) * \exp(-9/200))/40 - (9 * \exp(-9/200) * \sin(51/1000))/8 + 3/8, (51 * \cos(119/2000) * \exp(-21/400))/40 - (9 * \exp(-21/400) * \sin(119/2000))/8 + 3/8, \\
 & (51 * \cos(17/250) * \exp(-3/50))/40 - (9 * \exp(-3/50) * \sin(17/250))/8 + 3/8, (51 * \cos(153/2000) * \exp(-27/400))/40 - (9 * \exp(-27/400) * \sin(153/2000))/8 + 3/8, \\
 & (51 * \cos(17/200) * \exp(-3/40))/40 - (9 * \exp(-3/40) * \sin(17/200))/8 + 3/8, (51 * \cos(187/2000) * \exp(-33/400))/40 - (9 * \exp(-33/400) * \sin(187/2000))/8 + 3/8, \\
 & (51 * \cos(51/500) * \exp(-9/100))/40 - (9 * \exp(-9/100) * \sin(51/500))/8 + 3/8, (51 * \cos(221/2000) * \exp(-39/400))/40 - (9 * \exp(-39/400) * \sin(221/2000))/8 + 3/8, \\
 & (51 * \cos(119/1000) * \exp(-21/200))/40 - (9 * \exp(-21/200) * \sin(119/1000))/8 + 3/8, (51 * \cos(51/400) * \exp(-9/80))/40 - (9 * \exp(-9/80) * \sin(51/400))/8 + 3/8, \\
 & (51 * \cos(17/125) * \exp(-3/25))/40 - (9 * \exp(-3/25) * \sin(17/125))/8 + 3/8, (51 * \cos(289/2000) * \exp(-51/400))/40 - (9 * \exp(-51/400) * \sin(289/2000))/8 + 3/8, \\
 & (51 * \cos(153/1000) * \exp(-27/200))/40 - (9 * \exp(-27/200) * \sin(153/1000))/8 + 3/8, (51 * \cos(323/2000) * \exp(-57/400))/40 - (9 * \exp(-57/400) * \sin(323/2000))/8 + 3/8, \\
 & (51 * \cos(17/100) * \exp(-3/20))/40 - (9 * \exp(-3/20) * \sin(17/100))/8 + 3/8, (51 * \cos(357/2000) * \exp(-63/400))/40 - (9 * \exp(-63/400) * \sin(357/2000))/8 + 3/8,
 \end{aligned}$$

$(51 \cdot \cos(187/1000) \cdot \exp(-33/200))/40 - (9 \cdot \exp(-33/200) \cdot \sin(187/1000))/8 + 3/8,$
 $(51 \cdot \cos(391/2000) \cdot \exp(-69/400))/40 - (9 \cdot \exp(-69/400) \cdot \sin(391/2000))/8 + 3/8, (51 \cdot \cos(51/250) \cdot \exp(-9/50))/40 - (9 \cdot \exp(-9/50) \cdot \sin(51/250))/8 + 3/8, (51 \cdot \cos(17/80) \cdot \exp(-3/16))/40 - (9 \cdot \exp(-3/16) \cdot \sin(17/80))/8 + 3/8, (51 \cdot \cos(221/1000) \cdot \exp(-39/200))/40 - (9 \cdot \exp(-39/200) \cdot \sin(221/1000))/8 + 3/8, (51 \cdot \cos(459/2000) \cdot \exp(-81/400))/40 - (9 \cdot \exp(-81/400) \cdot \sin(459/2000))/8 + 3/8, (51 \cdot \cos(119/500) \cdot \exp(-21/100))/40 - (9 \cdot \exp(-21/100) \cdot \sin(119/500))/8 + 3/8, (51 \cdot \cos(493/2000) \cdot \exp(-87/400))/40 - (9 \cdot \exp(-87/400) \cdot \sin(493/2000))/8 + 3/8, (51 \cdot \cos(51/200) \cdot \exp(-9/40))/40 - (9 \cdot \exp(-9/40) \cdot \sin(51/200))/8 + 3/8, (51 \cdot \cos(527/2000) \cdot \exp(-93/400))/40 - (9 \cdot \exp(-93/400) \cdot \sin(527/2000))/8 + 3/8, (51 \cdot \cos(34/125) \cdot \exp(-6/25))/40 - (9 \cdot \exp(-6/25) \cdot \sin(34/125))/8 + 3/8, (51 \cdot \cos(561/2000) \cdot \exp(-99/400))/40 - (9 \cdot \exp(-99/400) \cdot \sin(561/2000))/8 + 3/8, (51 \cdot \cos(289/1000) \cdot \exp(-51/200))/40 - (9 \cdot \exp(-51/200) \cdot \sin(289/1000))/8 + 3/8, (51 \cdot \cos(119/400) \cdot \exp(-21/80))/40 - (9 \cdot \exp(-21/80) \cdot \sin(119/400))/8 + 3/8, (51 \cdot \cos(153/500) \cdot \exp(-27/100))/40 - (9 \cdot \exp(-27/100) \cdot \sin(153/500))/8 + 3/8, (51 \cdot \cos(629/2000) \cdot \exp(-111/400))/40 - (9 \cdot \exp(-111/400) \cdot \sin(629/2000))/8 + 3/8, (51 \cdot \cos(323/1000) \cdot \exp(-57/200))/40 - (9 \cdot \exp(-57/200) \cdot \sin(323/1000))/8 + 3/8, (51 \cdot \cos(663/2000) \cdot \exp(-117/400))/40 - (9 \cdot \exp(-117/400) \cdot \sin(663/2000))/8 + 3/8, (51 \cdot \cos(17/50) \cdot \exp(-3/10))/40 - (9 \cdot \exp(-3/10) \cdot \sin(17/50))/8 + 3/8, (51 \cdot \cos(697/2000) \cdot \exp(-123/400))/40 - (9 \cdot \exp(-123/400) \cdot \sin(697/2000))/8 + 3/8, (51 \cdot \cos(357/1000) \cdot \exp(-63/200))/40 - (9 \cdot \exp(-63/200) \cdot \sin(357/1000))/8 + 3/8, (51 \cdot \cos(731/2000) \cdot \exp(-129/400))/40 - (9 \cdot \exp(-129/400) \cdot \sin(731/2000))/8 + 3/8, (51 \cdot \cos(187/500) \cdot \exp(-33/100))/40 - (9 \cdot \exp(-33/100) \cdot \sin(187/500))/8 + 3/8, (51 \cdot \cos(153/400) \cdot \exp(-27/80))/40 - (9 \cdot \exp(-27/80) \cdot \sin(153/400))/8 + 3/8, (51 \cdot \cos(391/1000) \cdot \exp(-69/200))/40 - (9 \cdot \exp(-69/200) \cdot \sin(391/1000))/8 + 3/8, (51 \cdot \cos(799/2000) \cdot \exp(-141/400))/40 - (9 \cdot \exp(-141/400) \cdot \sin(799/2000))/8 + 3/8, (51 \cdot \cos(51/125) \cdot \exp(-9/25))/40 - (9 \cdot \exp(-9/25) \cdot \sin(51/125))/8 + 3/8, (51 \cdot \cos(833/2000) \cdot \exp(-147/400))/40 - (9 \cdot \exp(-147/400) \cdot \sin(833/2000))/8 + 3/8, (51 \cdot \cos(17/40) \cdot \exp(-3/8))/40 - (9 \cdot \exp(-3/8) \cdot \sin(17/40))/8 + 3/8, (51 \cdot \cos(867/2000) \cdot \exp(-153/400))/40 - (9 \cdot \exp(-153/400) \cdot \sin(867/2000))/8 + 3/8, (51 \cdot \cos(221/500) \cdot \exp(-39/100))/40 - (9 \cdot \exp(-39/100) \cdot \sin(221/500))/8 + 3/8, (51 \cdot \cos(901/2000) \cdot \exp(-159/400))/40 - (9 \cdot \exp(-159/400) \cdot \sin(901/2000))/8 + 3/8, (51 \cdot \cos(459/1000) \cdot \exp(-81/200))/40 - (9 \cdot \exp(-81/200) \cdot \sin(459/1000))/8 + 3/8, (51 \cdot \cos(187/400) \cdot \exp(-33/80))/40 - (9 \cdot \exp(-33/80) \cdot \sin(187/400))/8 + 3/8, (51 \cdot \cos(119/250) \cdot \exp(-21/50))/40 - (9 \cdot \exp(-21/50) \cdot \sin(119/250))/8 + 3/8, (51 \cdot \cos(969/2000) \cdot \exp(-171/400))/40 - (9 \cdot \exp(-171/400) \cdot \sin(969/2000))/8 + 3/8, (51 \cdot \cos(493/1000) \cdot \exp(-87/200))/40 - (9 \cdot \exp(-87/200) \cdot \sin(493/1000))/8 + 3/8, (51 \cdot \cos(1003/2000) \cdot \exp(-177/400))/40 - (9 \cdot \exp(-177/400) \cdot \sin(1003/2000))/8 + 3/8, (51 \cdot \cos(51/100) \cdot \exp(-9/20))/40 - (9 \cdot \exp(-9/20) \cdot \sin(51/100))/8 + 3/8, (51 \cdot \cos(1037/2000) \cdot \exp(-183/400))/40 - (9 \cdot \exp(-183/400) \cdot \sin(1037/2000))/8 + 3/8, (51 \cdot \cos(527/1000) \cdot \exp(-93/200))/40 - (9 \cdot \exp(-93/200) \cdot \sin(527/1000))/8 + 3/8, (51 \cdot \cos(1071/2000) \cdot \exp(-189/400))/40 - (9 \cdot \exp(-189/400) \cdot \sin(1071/2000))/8 + 3/8, (51 \cdot \cos(68/125) \cdot \exp(-12/25))/40 - (9 \cdot \exp(-12/25) \cdot \sin(68/125))/8 + 3/8, (51 \cdot \cos(221/400) \cdot \exp(-39/80))/40 - (9 \cdot \exp(-39/80) \cdot \sin(221/400))/8 + 3/8, (51 \cdot \cos(561/1000) \cdot \exp(-99/200))/40 - (9 \cdot \exp(-99/200) \cdot \sin(561/1000))/8 + 3/8, (51 \cdot \cos(1139/2000) \cdot \exp(-201/400))/40 - (9 \cdot \exp(-201/400) \cdot \sin(1139/2000))/8 + 3/8, (51 \cdot \cos(289/500) \cdot \exp(-51/100))/40 - (9 \cdot \exp(-51/100) \cdot \sin(289/500))/8 + 3/8, (51 \cdot \cos(1173/2000) \cdot \exp(-207/400))/40 - (9 \cdot \exp(-207/400) \cdot \sin(1173/2000))/8 + 3/8, (51 \cdot \cos(119/200) \cdot \exp(-21/40))/40 - (9 \cdot \exp(-21/40) \cdot \sin(119/200))/8 + 3/8, (51 \cdot \cos(1207/2000) \cdot \exp(-213/400))/40 - (9 \cdot \exp(-213/400) \cdot \sin(1207/2000))/8 + 3/8, (51 \cdot \cos(153/250) \cdot \exp(-27/50))/40 - (9 \cdot \exp(-27/50) \cdot \sin(153/250))/8 + 3/8, (51 \cdot \cos(1241/2000) \cdot \exp(-$

$(219/400))/40 - (9*\exp(-219/400)*\sin(1241/2000))/8 + 3/8, (51*\cos(629/1000)*\exp(-111/200))/40 -$
 $(9*\exp(-111/200)*\sin(629/1000))/8 + 3/8, (51*\cos(51/80)*\exp(-9/16))/40 - (9*\exp(-9/16)*\sin(51/80))/8$
 $+ 3/8, (51*\cos(323/500)*\exp(-57/100))/40 - (9*\exp(-57/100)*\sin(323/500))/8 + 3/8,$
 $(51*\cos(1309/2000)*\exp(-231/400))/40 - (9*\exp(-231/400)*\sin(1309/2000))/8 + 3/8,$
 $(51*\cos(663/1000)*\exp(-117/200))/40 - (9*\exp(-117/200)*\sin(663/1000))/8 + 3/8,$
 $(51*\cos(1343/2000)*\exp(-237/400))/40 - (9*\exp(-237/400)*\sin(1343/2000))/8 + 3/8,$
 $(51*\cos(17/25)*\exp(-3/5))/40 - (9*\exp(-3/5)*\sin(17/25))/8 + 3/8, (51*\cos(1377/2000)*\exp(-$
 $243/400))/40 - (9*\exp(-243/400)*\sin(1377/2000))/8 + 3/8, (51*\cos(697/1000)*\exp(-123/200))/40 -$
 $(9*\exp(-123/200)*\sin(697/1000))/8 + 3/8, (51*\cos(1411/2000)*\exp(-249/400))/40 - (9*\exp(-$
 $249/400)*\sin(1411/2000))/8 + 3/8, (51*\cos(357/500)*\exp(-63/100))/40 - (9*\exp(-$
 $63/100)*\sin(357/500))/8 + 3/8, (51*\cos(289/400)*\exp(-51/80))/40 - (9*\exp(-51/80)*\sin(289/400))/8 +$
 $3/8, (51*\cos(731/1000)*\exp(-129/200))/40 - (9*\exp(-129/200)*\sin(731/1000))/8 + 3/8,$
 $(51*\cos(1479/2000)*\exp(-261/400))/40 - (9*\exp(-261/400)*\sin(1479/2000))/8 + 3/8,$
 $(51*\cos(187/250)*\exp(-33/50))/40 - (9*\exp(-33/50)*\sin(187/250))/8 + 3/8, (51*\cos(1513/2000)*\exp(-$
 $267/400))/40 - (9*\exp(-267/400)*\sin(1513/2000))/8 + 3/8, (51*\cos(153/200)*\exp(-27/40))/40 - (9*\exp(-$
 $27/40)*\sin(153/200))/8 + 3/8, (51*\cos(1547/2000)*\exp(-273/400))/40 - (9*\exp(-$
 $273/400)*\sin(1547/2000))/8 + 3/8, (51*\cos(391/500)*\exp(-69/100))/40 - (9*\exp(-$
 $69/100)*\sin(391/500))/8 + 3/8, (51*\cos(1581/2000)*\exp(-279/400))/40 - (9*\exp(-$
 $279/400)*\sin(1581/2000))/8 + 3/8, (51*\cos(799/1000)*\exp(-141/200))/40 - (9*\exp(-$
 $141/200)*\sin(799/1000))/8 + 3/8, (51*\cos(323/400)*\exp(-57/80))/40 - (9*\exp(-57/80)*\sin(323/400))/8$
 $+ 3/8, (51*\cos(102/125)*\exp(-18/25))/40 - (9*\exp(-18/25)*\sin(102/125))/8 + 3/8,$
 $(51*\cos(1649/2000)*\exp(-291/400))/40 - (9*\exp(-291/400)*\sin(1649/2000))/8 + 3/8,$
 $(51*\cos(833/1000)*\exp(-147/200))/40 - (9*\exp(-147/200)*\sin(833/1000))/8 + 3/8,$
 $(51*\cos(1683/2000)*\exp(-297/400))/40 - (9*\exp(-297/400)*\sin(1683/2000))/8 + 3/8,$
 $(51*\cos(17/20)*\exp(-3/4))/40 - (9*\exp(-3/4)*\sin(17/20))/8 + 3/8, (51*\cos(1717/2000)*\exp(-$
 $303/400))/40 - (9*\exp(-303/400)*\sin(1717/2000))/8 + 3/8, (51*\cos(867/1000)*\exp(-153/200))/40 -$
 $(9*\exp(-153/200)*\sin(867/1000))/8 + 3/8, (51*\cos(1751/2000)*\exp(-309/400))/40 - (9*\exp(-$
 $309/400)*\sin(1751/2000))/8 + 3/8, (51*\cos(221/250)*\exp(-39/50))/40 - (9*\exp(-39/50)*\sin(221/250))/8$
 $+ 3/8, (51*\cos(357/400)*\exp(-63/80))/40 - (9*\exp(-63/80)*\sin(357/400))/8 + 3/8,$
 $(51*\cos(901/1000)*\exp(-159/200))/40 - (9*\exp(-159/200)*\sin(901/1000))/8 + 3/8,$
 $(51*\cos(1819/2000)*\exp(-321/400))/40 - (9*\exp(-321/400)*\sin(1819/2000))/8 + 3/8,$
 $(51*\cos(459/500)*\exp(-81/100))/40 - (9*\exp(-81/100)*\sin(459/500))/8 + 3/8, (51*\cos(1853/2000)*\exp(-$
 $327/400))/40 - (9*\exp(-327/400)*\sin(1853/2000))/8 + 3/8, (51*\cos(187/200)*\exp(-33/40))/40 - (9*\exp(-$
 $33/40)*\sin(187/200))/8 + 3/8, (51*\cos(1887/2000)*\exp(-333/400))/40 - (9*\exp(-$
 $333/400)*\sin(1887/2000))/8 + 3/8, (51*\cos(119/125)*\exp(-21/25))/40 - (9*\exp(-21/25)*\sin(119/125))/8$
 $+ 3/8, (51*\cos(1921/2000)*\exp(-339/400))/40 - (9*\exp(-339/400)*\sin(1921/2000))/8 + 3/8,$
 $(51*\cos(969/1000)*\exp(-171/200))/40 - (9*\exp(-171/200)*\sin(969/1000))/8 + 3/8,$
 $(51*\cos(391/400)*\exp(-69/80))/40 - (9*\exp(-69/80)*\sin(391/400))/8 + 3/8, (51*\cos(493/500)*\exp(-$
 $87/100))/40 - (9*\exp(-87/100)*\sin(493/500))/8 + 3/8, (51*\cos(1989/2000)*\exp(-351/400))/40 - (9*\exp(-$
 $351/400)*\sin(1989/2000))/8 + 3/8, (51*\cos(1003/1000)*\exp(-177/200))/40 - (9*\exp(-$
 $177/200)*\sin(1003/1000))/8 + 3/8, (51*\cos(2023/2000)*\exp(-357/400))/40 - (9*\exp(-$
 $357/400)*\sin(2023/2000))/8 + 3/8, (51*\cos(51/50)*\exp(-9/10))/40 - (9*\exp(-9/10)*\sin(51/50))/8 + 3/8,$
 $(51*\cos(2057/2000)*\exp(-363/400))/40 - (9*\exp(-363/400)*\sin(2057/2000))/8 + 3/8,$
 $(51*\cos(1037/1000)*\exp(-183/200))/40 - (9*\exp(-183/200)*\sin(1037/1000))/8 + 3/8,$

$(51 \cdot \cos(2091/2000) \cdot \exp(-369/400))/40 - (9 \cdot \exp(-369/400) \cdot \sin(2091/2000))/8 + 3/8,$
 $(51 \cdot \cos(527/500) \cdot \exp(-93/100))/40 - (9 \cdot \exp(-93/100) \cdot \sin(527/500))/8 + 3/8, (51 \cdot \cos(17/16) \cdot \exp(-$
 $15/16))/40 - (9 \cdot \exp(-15/16) \cdot \sin(17/16))/8 + 3/8, (51 \cdot \cos(1071/1000) \cdot \exp(-189/200))/40 - (9 \cdot \exp(-$
 $189/200) \cdot \sin(1071/1000))/8 + 3/8, (51 \cdot \cos(2159/2000) \cdot \exp(-381/400))/40 - (9 \cdot \exp(-$
 $381/400) \cdot \sin(2159/2000))/8 + 3/8, (51 \cdot \cos(136/125) \cdot \exp(-24/25))/40 - (9 \cdot \exp(-24/25) \cdot \sin(136/125))/8$
 $+ 3/8, (51 \cdot \cos(2193/2000) \cdot \exp(-387/400))/40 - (9 \cdot \exp(-387/400) \cdot \sin(2193/2000))/8 + 3/8,$
 $(51 \cdot \cos(221/200) \cdot \exp(-39/40))/40 - (9 \cdot \exp(-39/40) \cdot \sin(221/200))/8 + 3/8, (51 \cdot \cos(2227/2000) \cdot \exp(-$
 $393/400))/40 - (9 \cdot \exp(-393/400) \cdot \sin(2227/2000))/8 + 3/8, (51 \cdot \cos(561/500) \cdot \exp(-99/100))/40 -$
 $(9 \cdot \exp(-99/100) \cdot \sin(561/500))/8 + 3/8, (51 \cdot \cos(2261/2000) \cdot \exp(-399/400))/40 - (9 \cdot \exp(-$
 $399/400) \cdot \sin(2261/2000))/8 + 3/8, (51 \cdot \cos(1139/1000) \cdot \exp(-201/200))/40 - (9 \cdot \exp(-$
 $201/200) \cdot \sin(1139/1000))/8 + 3/8, (51 \cdot \cos(459/400) \cdot \exp(-81/80))/40 - (9 \cdot \exp(-81/80) \cdot \sin(459/400))/8$
 $+ 3/8, (51 \cdot \cos(289/250) \cdot \exp(-51/50))/40 - (9 \cdot \exp(-51/50) \cdot \sin(289/250))/8 + 3/8,$
 $(51 \cdot \cos(2329/2000) \cdot \exp(-411/400))/40 - (9 \cdot \exp(-411/400) \cdot \sin(2329/2000))/8 + 3/8,$
 $(51 \cdot \cos(1173/1000) \cdot \exp(-207/200))/40 - (9 \cdot \exp(-207/200) \cdot \sin(1173/1000))/8 + 3/8,$
 $(51 \cdot \cos(2363/2000) \cdot \exp(-417/400))/40 - (9 \cdot \exp(-417/400) \cdot \sin(2363/2000))/8 + 3/8,$
 $(51 \cdot \cos(119/100) \cdot \exp(-21/20))/40 - (9 \cdot \exp(-21/20) \cdot \sin(119/100))/8 + 3/8, (51 \cdot \cos(2397/2000) \cdot \exp(-$
 $423/400))/40 - (9 \cdot \exp(-423/400) \cdot \sin(2397/2000))/8 + 3/8, (51 \cdot \cos(1207/1000) \cdot \exp(-213/200))/40 -$
 $(9 \cdot \exp(-213/200) \cdot \sin(1207/1000))/8 + 3/8, (51 \cdot \cos(2431/2000) \cdot \exp(-429/400))/40 - (9 \cdot \exp(-$
 $429/400) \cdot \sin(2431/2000))/8 + 3/8, (51 \cdot \cos(153/125) \cdot \exp(-27/25))/40 - (9 \cdot \exp(-27/25) \cdot \sin(153/125))/8$
 $+ 3/8, (51 \cdot \cos(493/400) \cdot \exp(-87/80))/40 - (9 \cdot \exp(-87/80) \cdot \sin(493/400))/8 + 3/8,$
 $(51 \cdot \cos(1241/1000) \cdot \exp(-219/200))/40 - (9 \cdot \exp(-219/200) \cdot \sin(1241/1000))/8 + 3/8,$
 $(51 \cdot \cos(2499/2000) \cdot \exp(-441/400))/40 - (9 \cdot \exp(-441/400) \cdot \sin(2499/2000))/8 + 3/8,$
 $(51 \cdot \cos(629/500) \cdot \exp(-111/100))/40 - (9 \cdot \exp(-111/100) \cdot \sin(629/500))/8 + 3/8,$
 $(51 \cdot \cos(2533/2000) \cdot \exp(-447/400))/40 - (9 \cdot \exp(-447/400) \cdot \sin(2533/2000))/8 + 3/8,$
 $(51 \cdot \cos(51/40) \cdot \exp(-9/8))/40 - (9 \cdot \exp(-9/8) \cdot \sin(51/40))/8 + 3/8, (51 \cdot \cos(2567/2000) \cdot \exp(-$
 $453/400))/40 - (9 \cdot \exp(-453/400) \cdot \sin(2567/2000))/8 + 3/8, (51 \cdot \cos(323/250) \cdot \exp(-57/50))/40 - (9 \cdot \exp(-$
 $57/50) \cdot \sin(323/250))/8 + 3/8, (51 \cdot \cos(2601/2000) \cdot \exp(-459/400))/40 - (9 \cdot \exp(-$
 $459/400) \cdot \sin(2601/2000))/8 + 3/8, (51 \cdot \cos(1309/1000) \cdot \exp(-231/200))/40 - (9 \cdot \exp(-$
 $231/200) \cdot \sin(1309/1000))/8 + 3/8, (51 \cdot \cos(527/400) \cdot \exp(-93/80))/40 - (9 \cdot \exp(-93/80) \cdot \sin(527/400))/8$
 $+ 3/8, (51 \cdot \cos(663/500) \cdot \exp(-117/100))/40 - (9 \cdot \exp(-117/100) \cdot \sin(663/500))/8 + 3/8,$
 $(51 \cdot \cos(2669/2000) \cdot \exp(-471/400))/40 - (9 \cdot \exp(-471/400) \cdot \sin(2669/2000))/8 + 3/8,$
 $(51 \cdot \cos(1343/1000) \cdot \exp(-237/200))/40 - (9 \cdot \exp(-237/200) \cdot \sin(1343/1000))/8 + 3/8,$
 $(51 \cdot \cos(2703/2000) \cdot \exp(-477/400))/40 - (9 \cdot \exp(-477/400) \cdot \sin(2703/2000))/8 + 3/8,$
 $(51 \cdot \cos(34/25) \cdot \exp(-6/5))/40 - (9 \cdot \exp(-6/5) \cdot \sin(34/25))/8 + 3/8, (51 \cdot \cos(2737/2000) \cdot \exp(-$
 $483/400))/40 - (9 \cdot \exp(-483/400) \cdot \sin(2737/2000))/8 + 3/8, (51 \cdot \cos(1377/1000) \cdot \exp(-243/200))/40 -$
 $(9 \cdot \exp(-243/200) \cdot \sin(1377/1000))/8 + 3/8, (51 \cdot \cos(2771/2000) \cdot \exp(-489/400))/40 - (9 \cdot \exp(-$
 $489/400) \cdot \sin(2771/2000))/8 + 3/8, (51 \cdot \cos(697/500) \cdot \exp(-123/100))/40 - (9 \cdot \exp(-$
 $123/100) \cdot \sin(697/500))/8 + 3/8, (51 \cdot \cos(561/400) \cdot \exp(-99/80))/40 - (9 \cdot \exp(-99/80) \cdot \sin(561/400))/8 +$
 $3/8, (51 \cdot \cos(1411/1000) \cdot \exp(-249/200))/40 - (9 \cdot \exp(-249/200) \cdot \sin(1411/1000))/8 + 3/8,$
 $(51 \cdot \cos(2839/2000) \cdot \exp(-501/400))/40 - (9 \cdot \exp(-501/400) \cdot \sin(2839/2000))/8 + 3/8,$
 $(51 \cdot \cos(357/250) \cdot \exp(-63/50))/40 - (9 \cdot \exp(-63/50) \cdot \sin(357/250))/8 + 3/8, (51 \cdot \cos(2873/2000) \cdot \exp(-$
 $507/400))/40 - (9 \cdot \exp(-507/400) \cdot \sin(2873/2000))/8 + 3/8, (51 \cdot \cos(289/200) \cdot \exp(-51/40))/40 - (9 \cdot \exp(-$
 $51/40) \cdot \sin(289/200))/8 + 3/8, (51 \cdot \cos(2907/2000) \cdot \exp(-513/400))/40 - (9 \cdot \exp(-$
 $513/400) \cdot \sin(2907/2000))/8 + 3/8, (51 \cdot \cos(731/500) \cdot \exp(-129/100))/40 - (9 \cdot \exp(-$

$(129/100) \cdot \sin(731/500))/8 + 3/8, (51 \cdot \cos(2941/2000) \cdot \exp(-519/400))/40 - (9 \cdot \exp(-519/400) \cdot \sin(2941/2000))/8 + 3/8, (51 \cdot \cos(1479/1000) \cdot \exp(-261/200))/40 - (9 \cdot \exp(-261/200) \cdot \sin(1479/1000))/8 + 3/8, (51 \cdot \cos(119/80) \cdot \exp(-21/16))/40 - (9 \cdot \exp(-21/16) \cdot \sin(119/80))/8 + 3/8, (51 \cdot \cos(187/125) \cdot \exp(-33/25))/40 - (9 \cdot \exp(-33/25) \cdot \sin(187/125))/8 + 3/8, (51 \cdot \cos(3009/2000) \cdot \exp(-531/400))/40 - (9 \cdot \exp(-531/400) \cdot \sin(3009/2000))/8 + 3/8, (51 \cdot \cos(1513/1000) \cdot \exp(-267/200))/40 - (9 \cdot \exp(-267/200) \cdot \sin(1513/1000))/8 + 3/8, (51 \cdot \cos(3043/2000) \cdot \exp(-537/400))/40 - (9 \cdot \exp(-537/400) \cdot \sin(3043/2000))/8 + 3/8, (51 \cdot \cos(153/100) \cdot \exp(-27/20))/40 - (9 \cdot \exp(-27/20) \cdot \sin(153/100))/8 + 3/8, (51 \cdot \cos(3077/2000) \cdot \exp(-543/400))/40 - (9 \cdot \exp(-543/400) \cdot \sin(3077/2000))/8 + 3/8, (51 \cdot \cos(1547/1000) \cdot \exp(-273/200))/40 - (9 \cdot \exp(-273/200) \cdot \sin(1547/1000))/8 + 3/8, (51 \cdot \cos(3111/2000) \cdot \exp(-549/400))/40 - (9 \cdot \exp(-549/400) \cdot \sin(3111/2000))/8 + 3/8, (51 \cdot \cos(391/250) \cdot \exp(-69/50))/40 - (9 \cdot \exp(-69/50) \cdot \sin(391/250))/8 + 3/8, (51 \cdot \cos(629/400) \cdot \exp(-111/80))/40 - (9 \cdot \exp(-111/80) \cdot \sin(629/400))/8 + 3/8, (51 \cdot \cos(1581/1000) \cdot \exp(-279/200))/40 - (9 \cdot \exp(-279/200) \cdot \sin(1581/1000))/8 + 3/8, (51 \cdot \cos(3179/2000) \cdot \exp(-561/400))/40 - (9 \cdot \exp(-561/400) \cdot \sin(3179/2000))/8 + 3/8, (51 \cdot \cos(799/500) \cdot \exp(-141/100))/40 - (9 \cdot \exp(-141/100) \cdot \sin(799/500))/8 + 3/8, (51 \cdot \cos(3213/2000) \cdot \exp(-567/400))/40 - (9 \cdot \exp(-567/400) \cdot \sin(3213/2000))/8 + 3/8, (51 \cdot \cos(323/200) \cdot \exp(-57/40))/40 - (9 \cdot \exp(-57/40) \cdot \sin(323/200))/8 + 3/8, (51 \cdot \cos(3247/2000) \cdot \exp(-573/400))/40 - (9 \cdot \exp(-573/400) \cdot \sin(3247/2000))/8 + 3/8, (51 \cdot \cos(204/125) \cdot \exp(-36/25))/40 - (9 \cdot \exp(-36/25) \cdot \sin(204/125))/8 + 3/8, (51 \cdot \cos(3281/2000) \cdot \exp(-579/400))/40 - (9 \cdot \exp(-579/400) \cdot \sin(3281/2000))/8 + 3/8, (51 \cdot \cos(1649/1000) \cdot \exp(-291/200))/40 - (9 \cdot \exp(-291/200) \cdot \sin(1649/1000))/8 + 3/8, (51 \cdot \cos(663/400) \cdot \exp(-117/80))/40 - (9 \cdot \exp(-117/80) \cdot \sin(663/400))/8 + 3/8, (51 \cdot \cos(833/500) \cdot \exp(-147/100))/40 - (9 \cdot \exp(-147/100) \cdot \sin(833/500))/8 + 3/8, (51 \cdot \cos(3349/2000) \cdot \exp(-591/400))/40 - (9 \cdot \exp(-591/400) \cdot \sin(3349/2000))/8 + 3/8, (51 \cdot \cos(1683/1000) \cdot \exp(-297/200))/40 - (9 \cdot \exp(-297/200) \cdot \sin(1683/1000))/8 + 3/8, (51 \cdot \cos(3383/2000) \cdot \exp(-597/400))/40 - (9 \cdot \exp(-597/400) \cdot \sin(3383/2000))/8 + 3/8, (51 \cdot \cos(17/10) \cdot \exp(-3/2))/40 - (9 \cdot \exp(-3/2) \cdot \sin(17/10))/8 + 3/8, (51 \cdot \cos(3417/2000) \cdot \exp(-603/400))/40 - (9 \cdot \exp(-603/400) \cdot \sin(3417/2000))/8 + 3/8, (51 \cdot \cos(1717/1000) \cdot \exp(-303/200))/40 - (9 \cdot \exp(-303/200) \cdot \sin(1717/1000))/8 + 3/8, (51 \cdot \cos(3451/2000) \cdot \exp(-609/400))/40 - (9 \cdot \exp(-609/400) \cdot \sin(3451/2000))/8 + 3/8, (51 \cdot \cos(867/500) \cdot \exp(-153/100))/40 - (9 \cdot \exp(-153/100) \cdot \sin(867/500))/8 + 3/8, (51 \cdot \cos(697/400) \cdot \exp(-123/80))/40 - (9 \cdot \exp(-123/80) \cdot \sin(697/400))/8 + 3/8, (51 \cdot \cos(1751/1000) \cdot \exp(-309/200))/40 - (9 \cdot \exp(-309/200) \cdot \sin(1751/1000))/8 + 3/8, (51 \cdot \cos(3519/2000) \cdot \exp(-621/400))/40 - (9 \cdot \exp(-621/400) \cdot \sin(3519/2000))/8 + 3/8, (51 \cdot \cos(221/125) \cdot \exp(-39/25))/40 - (9 \cdot \exp(-39/25) \cdot \sin(221/125))/8 + 3/8, (51 \cdot \cos(3553/2000) \cdot \exp(-627/400))/40 - (9 \cdot \exp(-627/400) \cdot \sin(3553/2000))/8 + 3/8, (51 \cdot \cos(357/200) \cdot \exp(-63/40))/40 - (9 \cdot \exp(-63/40) \cdot \sin(357/200))/8 + 3/8, (51 \cdot \cos(3587/2000) \cdot \exp(-633/400))/40 - (9 \cdot \exp(-633/400) \cdot \sin(3587/2000))/8 + 3/8, (51 \cdot \cos(901/500) \cdot \exp(-159/100))/40 - (9 \cdot \exp(-159/100) \cdot \sin(901/500))/8 + 3/8, (51 \cdot \cos(3621/2000) \cdot \exp(-639/400))/40 - (9 \cdot \exp(-639/400) \cdot \sin(3621/2000))/8 + 3/8, (51 \cdot \cos(1819/1000) \cdot \exp(-321/200))/40 - (9 \cdot \exp(-321/200) \cdot \sin(1819/1000))/8 + 3/8, (51 \cdot \cos(731/400) \cdot \exp(-129/80))/40 - (9 \cdot \exp(-129/80) \cdot \sin(731/400))/8 + 3/8, (51 \cdot \cos(459/250) \cdot \exp(-81/50))/40 - (9 \cdot \exp(-81/50) \cdot \sin(459/250))/8 + 3/8, (51 \cdot \cos(3689/2000) \cdot \exp(-651/400))/40 - (9 \cdot \exp(-651/400) \cdot \sin(3689/2000))/8 + 3/8, (51 \cdot \cos(1853/1000) \cdot \exp(-327/200))/40 - (9 \cdot \exp(-327/200) \cdot \sin(1853/1000))/8 + 3/8, (51 \cdot \cos(3723/2000) \cdot \exp(-657/400))/40 - (9 \cdot \exp(-657/400) \cdot \sin(3723/2000))/8 + 3/8, (51 \cdot \cos(187/100) \cdot \exp(-33/20))/40 - (9 \cdot \exp(-33/20) \cdot \sin(187/100))/8 + 3/8, (51 \cdot \cos(3757/2000) \cdot \exp(-$

$$\begin{aligned}
& 663/400)/40 - (9*\exp(-663/400)*\sin(3757/2000))/8 + 3/8, (51*\cos(1887/1000)*\exp(-333/200))/40 - \\
& (9*\exp(-333/200)*\sin(1887/1000))/8 + 3/8, (51*\cos(3791/2000)*\exp(-669/400))/40 - (9*\exp(- \\
& 669/400)*\sin(3791/2000))/8 + 3/8, (51*\cos(238/125)*\exp(-42/25))/40 - (9*\exp(-42/25)*\sin(238/125))/8 \\
& + 3/8, (51*\cos(153/80)*\exp(-27/16))/40 - (9*\exp(-27/16)*\sin(153/80))/8 + 3/8, \\
& (51*\cos(1921/1000)*\exp(-339/200))/40 - (9*\exp(-339/200)*\sin(1921/1000))/8 + 3/8, \\
& (51*\cos(3859/2000)*\exp(-681/400))/40 - (9*\exp(-681/400)*\sin(3859/2000))/8 + 3/8, \\
& (51*\cos(969/500)*\exp(-171/100))/40 - (9*\exp(-171/100)*\sin(969/500))/8 + 3/8, \\
& (51*\cos(3893/2000)*\exp(-687/400))/40 - (9*\exp(-687/400)*\sin(3893/2000))/8 + 3/8, \\
& (51*\cos(391/200)*\exp(-69/40))/40 - (9*\exp(-69/40)*\sin(391/200))/8 + 3/8, (51*\cos(3927/2000)*\exp(- \\
& 693/400))/40 - (9*\exp(-693/400)*\sin(3927/2000))/8 + 3/8, (51*\cos(493/250)*\exp(-87/50))/40 - (9*\exp(- \\
& 87/50)*\sin(493/250))/8 + 3/8, (51*\cos(3961/2000)*\exp(-699/400))/40 - (9*\exp(- \\
& 699/400)*\sin(3961/2000))/8 + 3/8, (51*\cos(1989/1000)*\exp(-351/200))/40 - (9*\exp(- \\
& 351/200)*\sin(1989/1000))/8 + 3/8, (51*\cos(799/400)*\exp(-141/80))/40 - (9*\exp(- \\
& 141/80)*\sin(799/400))/8 + 3/8, (51*\cos(1003/500)*\exp(-177/100))/40 - (9*\exp(- \\
& 177/100)*\sin(1003/500))/8 + 3/8, (51*\cos(4029/2000)*\exp(-711/400))/40 - (9*\exp(- \\
& 711/400)*\sin(4029/2000))/8 + 3/8, (51*\cos(2023/1000)*\exp(-357/200))/40 - (9*\exp(- \\
& 357/200)*\sin(2023/1000))/8 + 3/8, (51*\cos(4063/2000)*\exp(-717/400))/40 - (9*\exp(- \\
& 717/400)*\sin(4063/2000))/8 + 3/8, (51*\cos(51/25)*\exp(-9/5))/40 - (9*\exp(-9/5)*\sin(51/25))/8 + 3/8, \\
& (51*\cos(4097/2000)*\exp(-723/400))/40 - (9*\exp(-723/400)*\sin(4097/2000))/8 + 3/8, \\
& (51*\cos(2057/1000)*\exp(-363/200))/40 - (9*\exp(-363/200)*\sin(2057/1000))/8 + 3/8, \\
& (51*\cos(4131/2000)*\exp(-729/400))/40 - (9*\exp(-729/400)*\sin(4131/2000))/8 + 3/8, \\
& (51*\cos(1037/500)*\exp(-183/100))/40 - (9*\exp(-183/100)*\sin(1037/500))/8 + 3/8, \\
& (51*\cos(833/400)*\exp(-147/80))/40 - (9*\exp(-147/80)*\sin(833/400))/8 + 3/8, (51*\cos(2091/1000)*\exp(- \\
& 369/200))/40 - (9*\exp(-369/200)*\sin(2091/1000))/8 + 3/8, (51*\cos(4199/2000)*\exp(-741/400))/40 - \\
& (9*\exp(-741/400)*\sin(4199/2000))/8 + 3/8, (51*\cos(527/250)*\exp(-93/50))/40 - (9*\exp(- \\
& 93/50)*\sin(527/250))/8 + 3/8, (51*\cos(4233/2000)*\exp(-747/400))/40 - (9*\exp(- \\
& 747/400)*\sin(4233/2000))/8 + 3/8, (51*\cos(17/8)*\exp(-15/8))/40 - (9*\exp(-15/8)*\sin(17/8))/8 + 3/8]
\end{aligned}$$

a =

$$-(153*\cos((17*t)/20)*\exp(-3*t/4))/80 - (6*\sin((17*t)/20)*\exp(-3*t/4))/25$$

an =

$$\begin{aligned}
& [-153/80, -(153*\cos(17/2000)*\exp(-3/400))/80 - (6*\exp(-3/400)*\sin(17/2000))/25, - \\
& (153*\cos(17/1000)*\exp(-3/200))/80 - (6*\exp(-3/200)*\sin(17/1000))/25, -(153*\cos(51/2000)*\exp(- \\
& 9/400))/80 - (6*\exp(-9/400)*\sin(51/2000))/25, -(153*\cos(17/500)*\exp(-3/100))/80 - (6*\exp(-
\end{aligned}$$

$3/100*\sin(17/500))/25, - (153*\cos(17/400)*\exp(-3/80))/80 - (6*\exp(-3/80)*\sin(17/400))/25, -$
 $(153*\cos(51/1000)*\exp(-9/200))/80 - (6*\exp(-9/200)*\sin(51/1000))/25, - (153*\cos(119/2000)*\exp(-$
 $21/400))/80 - (6*\exp(-21/400)*\sin(119/2000))/25, - (153*\cos(17/250)*\exp(-3/50))/80 - (6*\exp(-$
 $3/50)*\sin(17/250))/25, - (153*\cos(153/2000)*\exp(-27/400))/80 - (6*\exp(-27/400)*\sin(153/2000))/25, -$
 $(153*\cos(17/200)*\exp(-3/40))/80 - (6*\exp(-3/40)*\sin(17/200))/25, - (153*\cos(187/2000)*\exp(-$
 $33/400))/80 - (6*\exp(-33/400)*\sin(187/2000))/25, - (153*\cos(51/500)*\exp(-9/100))/80 - (6*\exp(-$
 $9/100)*\sin(51/500))/25, - (153*\cos(221/2000)*\exp(-39/400))/80 - (6*\exp(-39/400)*\sin(221/2000))/25, -$
 $(153*\cos(119/1000)*\exp(-21/200))/80 - (6*\exp(-21/200)*\sin(119/1000))/25, - (153*\cos(51/400)*\exp(-$
 $9/80))/80 - (6*\exp(-9/80)*\sin(51/400))/25, - (153*\cos(17/125)*\exp(-3/25))/80 - (6*\exp(-$
 $3/25)*\sin(17/125))/25, - (153*\cos(289/2000)*\exp(-51/400))/80 - (6*\exp(-51/400)*\sin(289/2000))/25, -$
 $(153*\cos(153/1000)*\exp(-27/200))/80 - (6*\exp(-27/200)*\sin(153/1000))/25, -$
 $(153*\cos(323/2000)*\exp(-57/400))/80 - (6*\exp(-57/400)*\sin(323/2000))/25, - (153*\cos(17/100)*\exp(-$
 $3/20))/80 - (6*\exp(-3/20)*\sin(17/100))/25, - (153*\cos(357/2000)*\exp(-63/400))/80 - (6*\exp(-$
 $63/400)*\sin(357/2000))/25, - (153*\cos(187/1000)*\exp(-33/200))/80 - (6*\exp(-$
 $33/200)*\sin(187/1000))/25, - (153*\cos(391/2000)*\exp(-69/400))/80 - (6*\exp(-$
 $69/400)*\sin(391/2000))/25, - (153*\cos(51/250)*\exp(-9/50))/80 - (6*\exp(-9/50)*\sin(51/250))/25, -$
 $(153*\cos(17/80)*\exp(-3/16))/80 - (6*\exp(-3/16)*\sin(17/80))/25, - (153*\cos(221/1000)*\exp(-$
 $39/200))/80 - (6*\exp(-39/200)*\sin(221/1000))/25, - (153*\cos(459/2000)*\exp(-81/400))/80 - (6*\exp(-$
 $81/400)*\sin(459/2000))/25, - (153*\cos(119/500)*\exp(-21/100))/80 - (6*\exp(-21/100)*\sin(119/500))/25,$
 $- (153*\cos(493/2000)*\exp(-87/400))/80 - (6*\exp(-87/400)*\sin(493/2000))/25, - (153*\cos(51/200)*\exp(-$
 $9/40))/80 - (6*\exp(-9/40)*\sin(51/200))/25, - (153*\cos(527/2000)*\exp(-93/400))/80 - (6*\exp(-$
 $93/400)*\sin(527/2000))/25, - (153*\cos(34/125)*\exp(-6/25))/80 - (6*\exp(-6/25)*\sin(34/125))/25, -$
 $(153*\cos(561/2000)*\exp(-99/400))/80 - (6*\exp(-99/400)*\sin(561/2000))/25, -$
 $(153*\cos(289/1000)*\exp(-51/200))/80 - (6*\exp(-51/200)*\sin(289/1000))/25, - (153*\cos(119/400)*\exp(-$
 $21/80))/80 - (6*\exp(-21/80)*\sin(119/400))/25, - (153*\cos(153/500)*\exp(-27/100))/80 - (6*\exp(-$
 $27/100)*\sin(153/500))/25, - (153*\cos(629/2000)*\exp(-111/400))/80 - (6*\exp(-$
 $111/400)*\sin(629/2000))/25, - (153*\cos(323/1000)*\exp(-57/200))/80 - (6*\exp(-$
 $57/200)*\sin(323/1000))/25, - (153*\cos(663/2000)*\exp(-117/400))/80 - (6*\exp(-$
 $117/400)*\sin(663/2000))/25, - (153*\cos(17/50)*\exp(-3/10))/80 - (6*\exp(-3/10)*\sin(17/50))/25, -$
 $(153*\cos(697/2000)*\exp(-123/400))/80 - (6*\exp(-123/400)*\sin(697/2000))/25, -$
 $(153*\cos(357/1000)*\exp(-63/200))/80 - (6*\exp(-63/200)*\sin(357/1000))/25, -$
 $(153*\cos(731/2000)*\exp(-129/400))/80 - (6*\exp(-129/400)*\sin(731/2000))/25, -$
 $(153*\cos(187/500)*\exp(-33/100))/80 - (6*\exp(-33/100)*\sin(187/500))/25, - (153*\cos(153/400)*\exp(-$
 $27/80))/80 - (6*\exp(-27/80)*\sin(153/400))/25, - (153*\cos(391/1000)*\exp(-69/200))/80 - (6*\exp(-$
 $69/200)*\sin(391/1000))/25, - (153*\cos(799/2000)*\exp(-141/400))/80 - (6*\exp(-$
 $141/400)*\sin(799/2000))/25, - (153*\cos(51/125)*\exp(-9/25))/80 - (6*\exp(-9/25)*\sin(51/125))/25, -$
 $(153*\cos(833/2000)*\exp(-147/400))/80 - (6*\exp(-147/400)*\sin(833/2000))/25, - (153*\cos(17/40)*\exp(-$
 $3/8))/80 - (6*\exp(-3/8)*\sin(17/40))/25, - (153*\cos(867/2000)*\exp(-153/400))/80 - (6*\exp(-$
 $153/400)*\sin(867/2000))/25, - (153*\cos(221/500)*\exp(-39/100))/80 - (6*\exp(-$
 $39/100)*\sin(221/500))/25, - (153*\cos(901/2000)*\exp(-159/400))/80 - (6*\exp(-$
 $159/400)*\sin(901/2000))/25, - (153*\cos(459/1000)*\exp(-81/200))/80 - (6*\exp(-$
 $81/200)*\sin(459/1000))/25, - (153*\cos(187/400)*\exp(-33/80))/80 - (6*\exp(-33/80)*\sin(187/400))/25, -$
 $(153*\cos(119/250)*\exp(-21/50))/80 - (6*\exp(-21/50)*\sin(119/250))/25, - (153*\cos(969/2000)*\exp(-$
 $171/400))/80 - (6*\exp(-171/400)*\sin(969/2000))/25, - (153*\cos(493/1000)*\exp(-87/200))/80 - (6*\exp(-$

$87/200) * \sin(493/1000))/25, - (153 * \cos(1003/2000) * \exp(-177/400))/80 - (6 * \exp(-177/400) * \sin(1003/2000))/25, - (153 * \cos(51/100) * \exp(-9/20))/80 - (6 * \exp(-9/20) * \sin(51/100))/25, - (153 * \cos(1037/2000) * \exp(-183/400))/80 - (6 * \exp(-183/400) * \sin(1037/2000))/25, - (153 * \cos(527/1000) * \exp(-93/200))/80 - (6 * \exp(-93/200) * \sin(527/1000))/25, - (153 * \cos(1071/2000) * \exp(-189/400))/80 - (6 * \exp(-189/400) * \sin(1071/2000))/25, - (153 * \cos(68/125) * \exp(-12/25))/80 - (6 * \exp(-12/25) * \sin(68/125))/25, - (153 * \cos(221/400) * \exp(-39/80))/80 - (6 * \exp(-39/80) * \sin(221/400))/25, - (153 * \cos(561/1000) * \exp(-99/200))/80 - (6 * \exp(-99/200) * \sin(561/1000))/25, - (153 * \cos(1139/2000) * \exp(-201/400))/80 - (6 * \exp(-201/400) * \sin(1139/2000))/25, - (153 * \cos(289/500) * \exp(-51/100))/80 - (6 * \exp(-51/100) * \sin(289/500))/25, - (153 * \cos(1173/2000) * \exp(-207/400))/80 - (6 * \exp(-207/400) * \sin(1173/2000))/25, - (153 * \cos(119/200) * \exp(-21/40))/80 - (6 * \exp(-21/40) * \sin(119/200))/25, - (153 * \cos(1207/2000) * \exp(-213/400))/80 - (6 * \exp(-213/400) * \sin(1207/2000))/25, - (153 * \cos(153/250) * \exp(-27/50))/80 - (6 * \exp(-27/50) * \sin(153/250))/25, - (153 * \cos(1241/2000) * \exp(-219/400))/80 - (6 * \exp(-219/400) * \sin(1241/2000))/25, - (153 * \cos(629/1000) * \exp(-111/200))/80 - (6 * \exp(-111/200) * \sin(629/1000))/25, - (153 * \cos(51/80) * \exp(-9/16))/80 - (6 * \exp(-9/16) * \sin(51/80))/25, - (153 * \cos(323/500) * \exp(-57/100))/80 - (6 * \exp(-57/100) * \sin(323/500))/25, - (153 * \cos(1309/2000) * \exp(-231/400))/80 - (6 * \exp(-231/400) * \sin(1309/2000))/25, - (153 * \cos(663/1000) * \exp(-117/200))/80 - (6 * \exp(-117/200) * \sin(663/1000))/25, - (153 * \cos(1343/2000) * \exp(-237/400))/80 - (6 * \exp(-237/400) * \sin(1343/2000))/25, - (153 * \cos(17/25) * \exp(-3/5))/80 - (6 * \exp(-3/5) * \sin(17/25))/25, - (153 * \cos(1377/2000) * \exp(-243/400))/80 - (6 * \exp(-243/400) * \sin(1377/2000))/25, - (153 * \cos(697/1000) * \exp(-123/200))/80 - (6 * \exp(-123/200) * \sin(697/1000))/25, - (153 * \cos(1411/2000) * \exp(-249/400))/80 - (6 * \exp(-249/400) * \sin(1411/2000))/25, - (153 * \cos(357/500) * \exp(-63/100))/80 - (6 * \exp(-63/100) * \sin(357/500))/25, - (153 * \cos(289/400) * \exp(-51/80))/80 - (6 * \exp(-51/80) * \sin(289/400))/25, - (153 * \cos(731/1000) * \exp(-129/200))/80 - (6 * \exp(-129/200) * \sin(731/1000))/25, - (153 * \cos(1479/2000) * \exp(-261/400))/80 - (6 * \exp(-261/400) * \sin(1479/2000))/25, - (153 * \cos(187/250) * \exp(-33/50))/80 - (6 * \exp(-33/50) * \sin(187/250))/25, - (153 * \cos(1513/2000) * \exp(-267/400))/80 - (6 * \exp(-267/400) * \sin(1513/2000))/25, - (153 * \cos(153/200) * \exp(-27/40))/80 - (6 * \exp(-27/40) * \sin(153/200))/25, - (153 * \cos(1547/2000) * \exp(-273/400))/80 - (6 * \exp(-273/400) * \sin(1547/2000))/25, - (153 * \cos(391/500) * \exp(-69/100))/80 - (6 * \exp(-69/100) * \sin(391/500))/25, - (153 * \cos(1581/2000) * \exp(-279/400))/80 - (6 * \exp(-279/400) * \sin(1581/2000))/25, - (153 * \cos(799/1000) * \exp(-141/200))/80 - (6 * \exp(-141/200) * \sin(799/1000))/25, - (153 * \cos(323/400) * \exp(-57/80))/80 - (6 * \exp(-57/80) * \sin(323/400))/25, - (153 * \cos(102/125) * \exp(-18/25))/80 - (6 * \exp(-18/25) * \sin(102/125))/25, - (153 * \cos(1649/2000) * \exp(-291/400))/80 - (6 * \exp(-291/400) * \sin(1649/2000))/25, - (153 * \cos(833/1000) * \exp(-147/200))/80 - (6 * \exp(-147/200) * \sin(833/1000))/25, - (153 * \cos(1683/2000) * \exp(-297/400))/80 - (6 * \exp(-297/400) * \sin(1683/2000))/25, - (153 * \cos(17/20) * \exp(-3/4))/80 - (6 * \exp(-3/4) * \sin(17/20))/25, - (153 * \cos(1717/2000) * \exp(-303/400))/80 - (6 * \exp(-303/400) * \sin(1717/2000))/25, - (153 * \cos(867/1000) * \exp(-153/200))/80 - (6 * \exp(-153/200) * \sin(867/1000))/25, - (153 * \cos(1751/2000) * \exp(-309/400))/80 - (6 * \exp(-309/400) * \sin(1751/2000))/25, - (153 * \cos(221/250) * \exp(-39/50))/80 - (6 * \exp(-39/50) * \sin(221/250))/25, - (153 * \cos(357/400) * \exp(-63/80))/80 - (6 * \exp(-63/80) * \sin(357/400))/25, - (153 * \cos(901/1000) * \exp(-159/200))/80 - (6 * \exp(-159/200) * \sin(901/1000))/25, - (153 * \cos(1819/2000) * \exp(-321/400))/80 - (6 * \exp(-321/400) * \sin(1819/2000))/25, - (153 * \cos(459/500) * \exp(-81/100))/80 - (6 * \exp(-$

$81/100*\sin(459/500))/25, - (153*\cos(1853/2000)*\exp(-327/400))/80 - (6*\exp(-327/400)*\sin(1853/2000))/25, - (153*\cos(187/200)*\exp(-33/40))/80 - (6*\exp(-33/40)*\sin(187/200))/25, - (153*\cos(1887/2000)*\exp(-333/400))/80 - (6*\exp(-333/400)*\sin(1887/2000))/25, - (153*\cos(119/125)*\exp(-21/25))/80 - (6*\exp(-21/25)*\sin(119/125))/25, - (153*\cos(1921/2000)*\exp(-339/400))/80 - (6*\exp(-339/400)*\sin(1921/2000))/25, - (153*\cos(969/1000)*\exp(-171/200))/80 - (6*\exp(-171/200)*\sin(969/1000))/25, - (153*\cos(391/400)*\exp(-69/80))/80 - (6*\exp(-69/80)*\sin(391/400))/25, - (153*\cos(493/500)*\exp(-87/100))/80 - (6*\exp(-87/100)*\sin(493/500))/25, - (153*\cos(1989/2000)*\exp(-351/400))/80 - (6*\exp(-351/400)*\sin(1989/2000))/25, - (153*\cos(1003/1000)*\exp(-177/200))/80 - (6*\exp(-177/200)*\sin(1003/1000))/25, - (153*\cos(2023/2000)*\exp(-357/400))/80 - (6*\exp(-357/400)*\sin(2023/2000))/25, - (153*\cos(51/50)*\exp(-9/10))/80 - (6*\exp(-9/10)*\sin(51/50))/25, - (153*\cos(2057/2000)*\exp(-363/400))/80 - (6*\exp(-363/400)*\sin(2057/2000))/25, - (153*\cos(1037/1000)*\exp(-183/200))/80 - (6*\exp(-183/200)*\sin(1037/1000))/25, - (153*\cos(2091/2000)*\exp(-369/400))/80 - (6*\exp(-369/400)*\sin(2091/2000))/25, - (153*\cos(527/500)*\exp(-93/100))/80 - (6*\exp(-93/100)*\sin(527/500))/25, - (153*\cos(17/16)*\exp(-15/16))/80 - (6*\exp(-15/16)*\sin(17/16))/25, - (153*\cos(1071/1000)*\exp(-189/200))/80 - (6*\exp(-189/200)*\sin(1071/1000))/25, - (153*\cos(2159/2000)*\exp(-381/400))/80 - (6*\exp(-381/400)*\sin(2159/2000))/25, - (153*\cos(136/125)*\exp(-24/25))/80 - (6*\exp(-24/25)*\sin(136/125))/25, - (153*\cos(2193/2000)*\exp(-387/400))/80 - (6*\exp(-387/400)*\sin(2193/2000))/25, - (153*\cos(221/200)*\exp(-39/40))/80 - (6*\exp(-39/40)*\sin(221/200))/25, - (153*\cos(2227/2000)*\exp(-393/400))/80 - (6*\exp(-393/400)*\sin(2227/2000))/25, - (153*\cos(561/500)*\exp(-99/100))/80 - (6*\exp(-99/100)*\sin(561/500))/25, - (153*\cos(2261/2000)*\exp(-399/400))/80 - (6*\exp(-399/400)*\sin(2261/2000))/25, - (153*\cos(1139/1000)*\exp(-201/200))/80 - (6*\exp(-201/200)*\sin(1139/1000))/25, - (153*\cos(459/400)*\exp(-81/80))/80 - (6*\exp(-81/80)*\sin(459/400))/25, - (153*\cos(289/250)*\exp(-51/50))/80 - (6*\exp(-51/50)*\sin(289/250))/25, - (153*\cos(2329/2000)*\exp(-411/400))/80 - (6*\exp(-411/400)*\sin(2329/2000))/25, - (153*\cos(1173/1000)*\exp(-207/200))/80 - (6*\exp(-207/200)*\sin(1173/1000))/25, - (153*\cos(2363/2000)*\exp(-417/400))/80 - (6*\exp(-417/400)*\sin(2363/2000))/25, - (153*\cos(119/100)*\exp(-21/20))/80 - (6*\exp(-21/20)*\sin(119/100))/25, - (153*\cos(2397/2000)*\exp(-423/400))/80 - (6*\exp(-423/400)*\sin(2397/2000))/25, - (153*\cos(1207/1000)*\exp(-213/200))/80 - (6*\exp(-213/200)*\sin(1207/1000))/25, - (153*\cos(2431/2000)*\exp(-429/400))/80 - (6*\exp(-429/400)*\sin(2431/2000))/25, - (153*\cos(153/125)*\exp(-27/25))/80 - (6*\exp(-27/25)*\sin(153/125))/25, - (153*\cos(493/400)*\exp(-87/80))/80 - (6*\exp(-87/80)*\sin(493/400))/25, - (153*\cos(1241/1000)*\exp(-219/200))/80 - (6*\exp(-219/200)*\sin(1241/1000))/25, - (153*\cos(2499/2000)*\exp(-441/400))/80 - (6*\exp(-441/400)*\sin(2499/2000))/25, - (153*\cos(629/500)*\exp(-111/100))/80 - (6*\exp(-111/100)*\sin(629/500))/25, - (153*\cos(2533/2000)*\exp(-447/400))/80 - (6*\exp(-447/400)*\sin(2533/2000))/25, - (153*\cos(51/40)*\exp(-9/8))/80 - (6*\exp(-9/8)*\sin(51/40))/25, - (153*\cos(2567/2000)*\exp(-453/400))/80 - (6*\exp(-453/400)*\sin(2567/2000))/25, - (153*\cos(323/250)*\exp(-57/50))/80 - (6*\exp(-57/50)*\sin(323/250))/25, - (153*\cos(2601/2000)*\exp(-459/400))/80 - (6*\exp(-459/400)*\sin(2601/2000))/25, - (153*\cos(1309/1000)*\exp(-231/200))/80 - (6*\exp(-231/200)*\sin(1309/1000))/25, - (153*\cos(527/400)*\exp(-93/80))/80 - (6*\exp(-93/80)*\sin(527/400))/25, - (153*\cos(663/500)*\exp(-117/100))/80 - (6*\exp(-117/100)*\sin(663/500))/25, - (153*\cos(2669/2000)*\exp(-471/400))/80 - (6*\exp(-471/400)*\sin(2669/2000))/25, - (153*\cos(1343/1000)*\exp(-237/200))/80 - (6*\exp(-237/200)*\sin(1343/1000))/25, -$

$(153 \cdot \cos(2703/2000) \cdot \exp(-477/400))/80 - (6 \cdot \exp(-477/400) \cdot \sin(2703/2000))/25, -$
 $(153 \cdot \cos(34/25) \cdot \exp(-6/5))/80 - (6 \cdot \exp(-6/5) \cdot \sin(34/25))/25, - (153 \cdot \cos(2737/2000) \cdot \exp(-$
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 $(6 \cdot \exp(-243/200) \cdot \sin(1377/1000))/25, - (153 \cdot \cos(2771/2000) \cdot \exp(-489/400))/80 - (6 \cdot \exp(-$
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 $(153 \cdot \cos(1411/1000) \cdot \exp(-249/200))/80 - (6 \cdot \exp(-249/200) \cdot \sin(1411/1000))/25, -$
 $(153 \cdot \cos(2839/2000) \cdot \exp(-501/400))/80 - (6 \cdot \exp(-501/400) \cdot \sin(2839/2000))/25, -$
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 $513/400) \cdot \sin(2907/2000))/25, - (153 \cdot \cos(731/500) \cdot \exp(-129/100))/80 - (6 \cdot \exp(-$
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 $(153 \cdot \cos(187/125) \cdot \exp(-33/25))/80 - (6 \cdot \exp(-33/25) \cdot \sin(187/125))/25, - (153 \cdot \cos(3009/2000) \cdot \exp(-$
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 $(6 \cdot \exp(-267/200) \cdot \sin(1513/1000))/25, - (153 \cdot \cos(3043/2000) \cdot \exp(-537/400))/80 - (6 \cdot \exp(-$
 $537/400) \cdot \sin(3043/2000))/25, - (153 \cdot \cos(153/100) \cdot \exp(-27/20))/80 - (6 \cdot \exp(-27/20) \cdot \sin(153/100))/25,$
 $- (153 \cdot \cos(3077/2000) \cdot \exp(-543/400))/80 - (6 \cdot \exp(-543/400) \cdot \sin(3077/2000))/25, -$
 $(153 \cdot \cos(1547/1000) \cdot \exp(-273/200))/80 - (6 \cdot \exp(-273/200) \cdot \sin(1547/1000))/25, -$
 $(153 \cdot \cos(3111/2000) \cdot \exp(-549/400))/80 - (6 \cdot \exp(-549/400) \cdot \sin(3111/2000))/25, -$
 $(153 \cdot \cos(391/250) \cdot \exp(-69/50))/80 - (6 \cdot \exp(-69/50) \cdot \sin(391/250))/25, - (153 \cdot \cos(629/400) \cdot \exp(-$
 $111/80))/80 - (6 \cdot \exp(-111/80) \cdot \sin(629/400))/25, - (153 \cdot \cos(1581/1000) \cdot \exp(-279/200))/80 - (6 \cdot \exp(-$
 $279/200) \cdot \sin(1581/1000))/25, - (153 \cdot \cos(3179/2000) \cdot \exp(-561/400))/80 - (6 \cdot \exp(-$
 $561/400) \cdot \sin(3179/2000))/25, - (153 \cdot \cos(799/500) \cdot \exp(-141/100))/80 - (6 \cdot \exp(-$
 $141/100) \cdot \sin(799/500))/25, - (153 \cdot \cos(3213/2000) \cdot \exp(-567/400))/80 - (6 \cdot \exp(-$
 $567/400) \cdot \sin(3213/2000))/25, - (153 \cdot \cos(323/200) \cdot \exp(-57/40))/80 - (6 \cdot \exp(-57/40) \cdot \sin(323/200))/25,$
 $- (153 \cdot \cos(3247/2000) \cdot \exp(-573/400))/80 - (6 \cdot \exp(-573/400) \cdot \sin(3247/2000))/25, -$
 $(153 \cdot \cos(204/125) \cdot \exp(-36/25))/80 - (6 \cdot \exp(-36/25) \cdot \sin(204/125))/25, - (153 \cdot \cos(3281/2000) \cdot \exp(-$
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 $(6 \cdot \exp(-291/200) \cdot \sin(1649/1000))/25, - (153 \cdot \cos(663/400) \cdot \exp(-117/80))/80 - (6 \cdot \exp(-$
 $117/80) \cdot \sin(663/400))/25, - (153 \cdot \cos(833/500) \cdot \exp(-147/100))/80 - (6 \cdot \exp(-$
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 $591/400) \cdot \sin(3349/2000))/25, - (153 \cdot \cos(1683/1000) \cdot \exp(-297/200))/80 - (6 \cdot \exp(-$
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 $(153 \cdot \cos(3417/2000) \cdot \exp(-603/400))/80 - (6 \cdot \exp(-603/400) \cdot \sin(3417/2000))/25, -$
 $(153 \cdot \cos(1717/1000) \cdot \exp(-303/200))/80 - (6 \cdot \exp(-303/200) \cdot \sin(1717/1000))/25, -$
 $(153 \cdot \cos(3451/2000) \cdot \exp(-609/400))/80 - (6 \cdot \exp(-609/400) \cdot \sin(3451/2000))/25, -$
 $(153 \cdot \cos(867/500) \cdot \exp(-153/100))/80 - (6 \cdot \exp(-153/100) \cdot \sin(867/500))/25, - (153 \cdot \cos(697/400) \cdot \exp(-$
 $123/80))/80 - (6 \cdot \exp(-123/80) \cdot \sin(697/400))/25, - (153 \cdot \cos(1751/1000) \cdot \exp(-309/200))/80 - (6 \cdot \exp(-$
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 $621/400) \cdot \sin(3519/2000))/25, - (153 \cdot \cos(221/125) \cdot \exp(-39/25))/80 - (6 \cdot \exp(-39/25) \cdot \sin(221/125))/25,$

- (153*cos(3553/2000)*exp(-627/400))/80 - (6*exp(-627/400)*sin(3553/2000))/25, -
(153*cos(357/200)*exp(-63/40))/80 - (6*exp(-63/40)*sin(357/200))/25, - (153*cos(3587/2000)*exp(-
633/400))/80 - (6*exp(-633/400)*sin(3587/2000))/25, - (153*cos(901/500)*exp(-159/100))/80 - (6*exp(-
159/100)*sin(901/500))/25, - (153*cos(3621/2000)*exp(-639/400))/80 - (6*exp(-
639/400)*sin(3621/2000))/25, - (153*cos(1819/1000)*exp(-321/200))/80 - (6*exp(-
321/200)*sin(1819/1000))/25, - (153*cos(731/400)*exp(-129/80))/80 - (6*exp(-
129/80)*sin(731/400))/25, - (153*cos(459/250)*exp(-81/50))/80 - (6*exp(-81/50)*sin(459/250))/25, -
(153*cos(3689/2000)*exp(-651/400))/80 - (6*exp(-651/400)*sin(3689/2000))/25, -
(153*cos(1853/1000)*exp(-327/200))/80 - (6*exp(-327/200)*sin(1853/1000))/25, -
(153*cos(3723/2000)*exp(-657/400))/80 - (6*exp(-657/400)*sin(3723/2000))/25, -
(153*cos(187/100)*exp(-33/20))/80 - (6*exp(-33/20)*sin(187/100))/25, - (153*cos(3757/2000)*exp(-
663/400))/80 - (6*exp(-663/400)*sin(3757/2000))/25, - (153*cos(1887/1000)*exp(-333/200))/80 -
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669/400)*sin(3791/2000))/25, - (153*cos(238/125)*exp(-42/25))/80 - (6*exp(-42/25)*sin(238/125))/25,
- (153*cos(153/80)*exp(-27/16))/80 - (6*exp(-27/16)*sin(153/80))/25, - (153*cos(1921/1000)*exp(-
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687/400)*sin(3893/2000))/25, - (153*cos(391/200)*exp(-69/40))/80 - (6*exp(-69/40)*sin(391/200))/25,
- (153*cos(3927/2000)*exp(-693/400))/80 - (6*exp(-693/400)*sin(3927/2000))/25, -
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(6*exp(-351/200)*sin(1989/1000))/25, - (153*cos(799/400)*exp(-141/80))/80 - (6*exp(-
141/80)*sin(799/400))/25, - (153*cos(1003/500)*exp(-177/100))/80 - (6*exp(-
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711/400)*sin(4029/2000))/25, - (153*cos(2023/1000)*exp(-357/200))/80 - (6*exp(-
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717/400)*sin(4063/2000))/25, - (153*cos(51/25)*exp(-9/5))/80 - (6*exp(-9/5)*sin(51/25))/25, -
(153*cos(4097/2000)*exp(-723/400))/80 - (6*exp(-723/400)*sin(4097/2000))/25, -
(153*cos(2057/1000)*exp(-363/200))/80 - (6*exp(-363/200)*sin(2057/1000))/25, -
(153*cos(4131/2000)*exp(-729/400))/80 - (6*exp(-729/400)*sin(4131/2000))/25, -
(153*cos(1037/500)*exp(-183/100))/80 - (6*exp(-183/100)*sin(1037/500))/25, -
(153*cos(833/400)*exp(-147/80))/80 - (6*exp(-147/80)*sin(833/400))/25, - (153*cos(2091/1000)*exp(-
369/200))/80 - (6*exp(-369/200)*sin(2091/1000))/25, - (153*cos(4199/2000)*exp(-741/400))/80 -
(6*exp(-741/400)*sin(4199/2000))/25, - (153*cos(527/250)*exp(-93/50))/80 - (6*exp(-
93/50)*sin(527/250))/25, - (153*cos(4233/2000)*exp(-747/400))/80 - (6*exp(-
747/400)*sin(4233/2000))/25, - (153*cos(17/8)*exp(-15/8))/80 - (6*exp(-15/8)*sin(17/8))/25]

QUESTION 4c

Program window

```
commandwindow
clear
clc
close all
syms x
y=5*sin(5*x)^5
yint=int(y,0,22/7)
format rat
```

Command window

y =

5*sin(5*x)^5

yint =

$$-\left(\cos\left(\frac{110}{7}\right) - 1\right)^3 \left(9 \cos\left(\frac{110}{7}\right) + \left(3 \cos\left(\frac{220}{7}\right)\right)/2 + 19/2\right)/15$$