

# CAD Practical Midterm Exam 20%

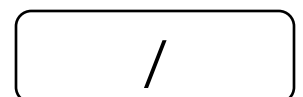
Spring 2022

Time: 40 minutes

..... الاسم: ..... رقم القيد: ..... المجموعة: .....

**Q: (8 Marks)** Solve the following Mathematical expressions using MATLAB:

Mathematical Expression	MATLAB Code
$\frac{d}{dx} \ln(x^2 + 1)$	<pre>syms x, diff(log(x^2+1)) ans = (2*x)/(x^2 + 1)</pre>
$\int \frac{dx}{x^2 + a^2}$	<pre>syms x a int(1/(x^2 + a^2)) ans = atan(x/a)/a</pre>
$\int_0^{\pi} 4t^3 \cos(t^4) dt$	<pre>syms t int(4*t^3*cos(t^4), 0, pi) ans = sin(pi^4)</pre>
$k = \sum_{n=1}^{100} \frac{2n+1}{n!}$	<pre>n = 1:100; k = sum((2*n + 1)./factorial(n)) k = 7.1548</pre>



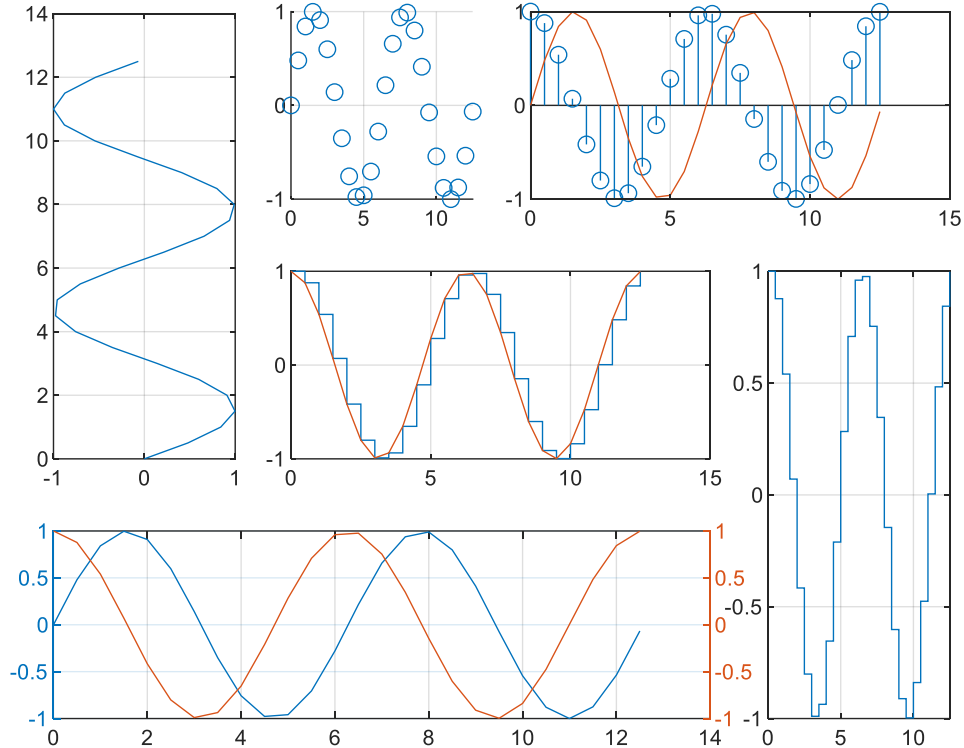
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Q: (6 Marks) Write a MATLAB code to get the following Figure:



```
clear; close all; clc; t = 0:0.5:4*pi;
```

```
figure(1)
```

```
subplot(3,4,[1 5]) ; plot(sin(t),t), grid on
```

```
subplot(3,4,2) ; scatter(t,sin(t)), grid on
```

```
subplot(3,4,3:4) ; stem(t,cos(t)), hold on, plot(t,sin(t)), grid on
```

```
subplot(3,4,6:7) ; stairs(t,cos(t)), hold on, plot(t,cos(t)), grid on
```

```
subplot(3,4,[8 12]); stairs(t,cos(t)), grid on
```

```
subplot(3,4,9:11) ; plotyy(t,sin(t),t,cos(t)), grid on
```

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Q: (6 Marks) Solve the following Algebraic Equations using MATLAB, ***your answer must be in decimal form***:

$$2x - 2z + 36 = 3 + 4y - 7z$$

$$2x - y + z + 2 = z - 2x - 3$$

$$x + 2y - 6z - 7 = 3x + 12 - 3z$$

$$2x - 4y + 5z = -33$$

$$4x - y + 0z = -5$$

$$-2x + 2y - 3z = 19$$

```
>> A = [2 -4 5; 4 -1 0; -2 2 -3]; b = [-33 ; -5 ; 19];
```

```
>> linsolve(A,b)
```

```
ans =
```

```
-0.5000
```

```
3.0000
```

```
-4.0000
```

$$100x^{2-6x+1} + 5 = 10$$

```
>> syms x
```

```
>> double( solve(100^(x^2-6*x+1) - 5) )
```

```
ans =
```

```
5.8895
```

```
0.1105
```

*Best of luck*