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

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

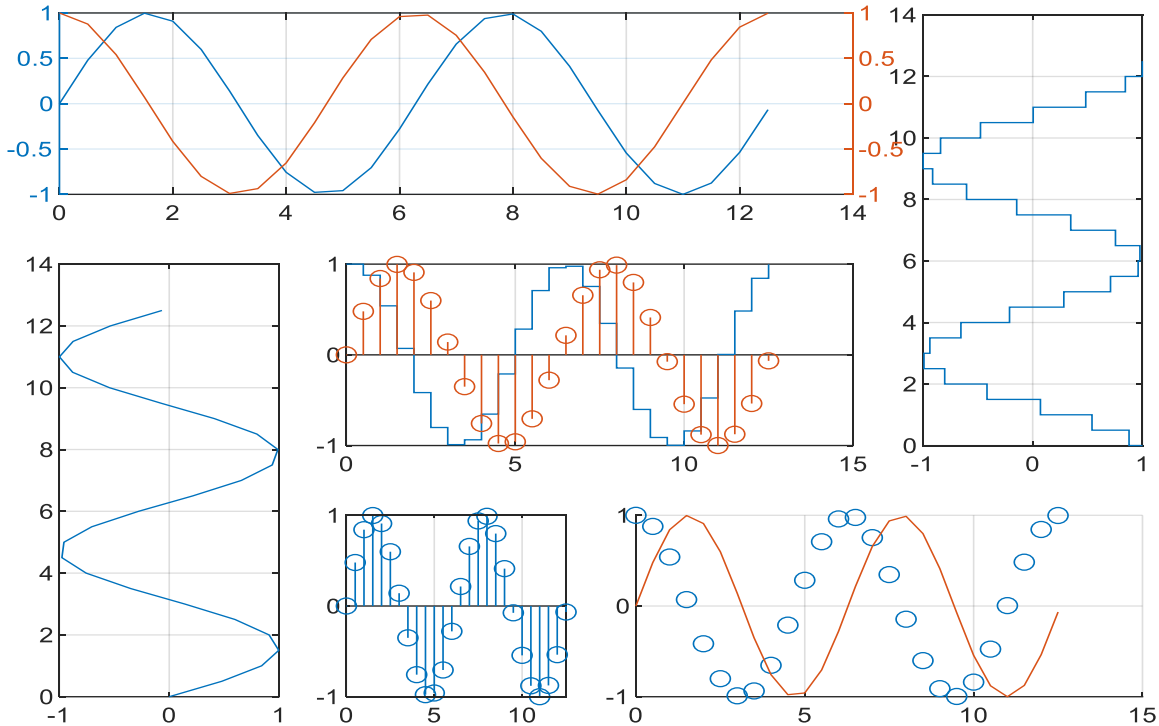| Mathematical Expression	MATLAB Code

$\dfrac{d^2}{dx^2}\dfrac{\sqrt{2x^2-1}}{x}$	```syms x```
	 ```diff(sqrt(2*x^2-1)/x,2)```
	 ans =
	 ```(2*(2*x^2 - 1)^(1/2))/x^3 - 2/(x*(2*x^2 - 1)^(1/2)) - (4*x)/(2*x^2 - 1)^(3/2)```

$\displaystyle\int_{-\pi}^{\pi} t\,\cos\left(t+\dfrac{\pi}{2}\right)dt$	```syms t```
	 ```int(t * cos(t + pi/2),-pi , pi)```
	 ans =
	 ```-2*pi```

$\dfrac{d}{dx}\ln(x^3+\pi)$	```syms x```
	 ```diff(x^3 + pi)```
	 ans =
	 ```3*x^2```

$k=$ $1+\dfrac{2}{1!}-\dfrac{2^2}{2!}+\cdots+\dfrac{2^{99}}{99!}-\dfrac{2^{100}}{100!}$	```k = sum(1 + (2.^(1:2:100))./factorial(1:2:100) - (2.^(2:2:100))./factorial(2:2:100))``` k = 50.8647
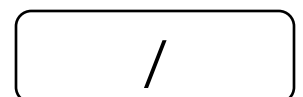
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Q: (6 Marks) Write a MATLAB code to get the following Figure:


```
clear; close all; clc; t = 0:0.5:4*pi;
figure(1)
subplot(3,4,[5 9]) ;  plot(sin(t),t), grid on
subplot(3,4,10)    ;  stem(t,sin(t)), grid on
subplot(3,4,11:12) ;  scatter(t,cos(t)), hold on, plot(t,sin(t)), grid on
subplot(3,4,6:7)   ;  stairs(t,cos(t)), hold on, stem(t,sin(t)), grid on
subplot(3,4,[4 8]) ;  stairs(cos(t),t), grid on
subplot(3,4,1:3)   ;  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_:

$2x - 2z = 3 - y$ $-y = z - x$ $x + y = 12 - 3z$ $\qquad\rightarrow$	$2x + y - 2z = 3$ $x - y - z = 0$ $x + y + 3z = 12$

```
A = [2 1 -2; 1 -1 -1; 1 1 3]; b = [3 ; 0 ; 12];
>> linsolve(A,b)
ans =
    3.5000
    1.0000
    2.5000
```

$\dfrac{1}{x-3} + \dfrac{1}{x+3} = \dfrac{-10}{x^2-9}$ $\qquad\rightarrow$	$\dfrac{1}{x-3} + \dfrac{1}{x+3} + \dfrac{10}{x^2-9} = 0$

```
syms x; double(solve( 1/(x-3) + 1/(x+3) + 10/(x^2-9) ))
ans =
    -5
```

Best of luck

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