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```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%         MATLAB HW 1      %%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%  - whenever you write code, it is a good practice to
%    add comments that describe the code.
%  - if you use 'two % marks' (%%), we can separate sections
%    in a script file.
%  - good luck!
```

Solution - Problem 1 (do not modify this line)

```
rho = 700;
v =  5;   % your turn
diam_ratio = [0.9, 0.8, 0.7, 0.6, 0.5, 0.2];

deltaP = 0.5*(1-diam_ratio.^2).^2*rho*v^2  % your turn
```

```
deltaP =

   1.0e+03 *

    0.3159    1.1340    2.2759    3.5840    4.9219    8.0640
```

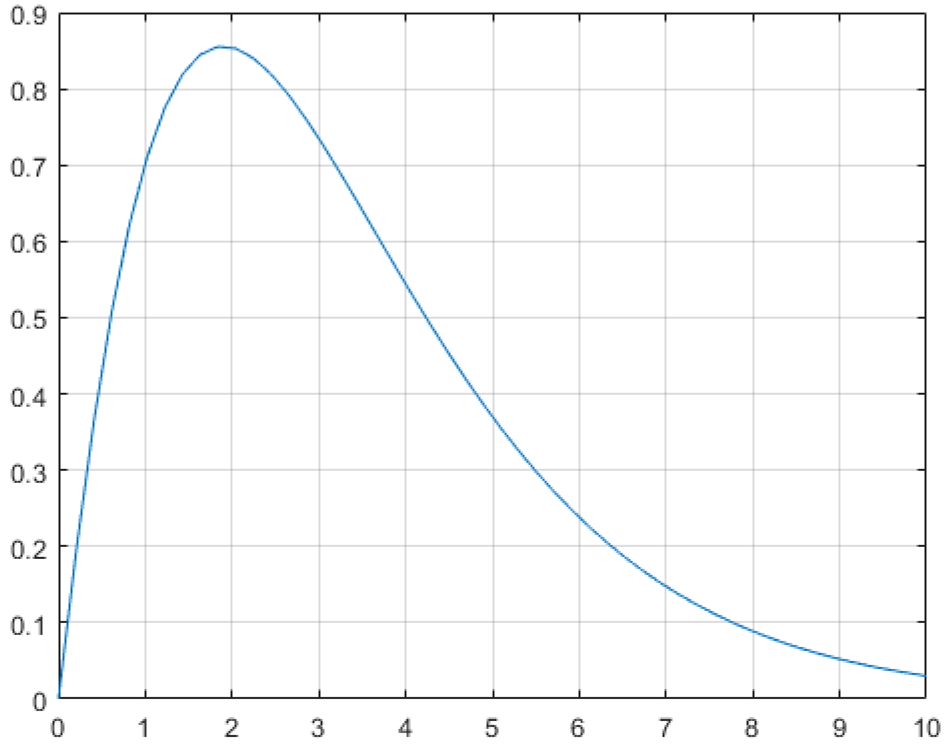
Solution - Problem 2 (do not modify this line)

```
func2 = @(x)(x.*exp(-0.7.*x).*sqrt(1+x));
func2(8)
x = linspace(0,10 ,50); % your turn
y = func2(x);

plot(x,y);  % your turn
grid on;
```

```
ans =
```

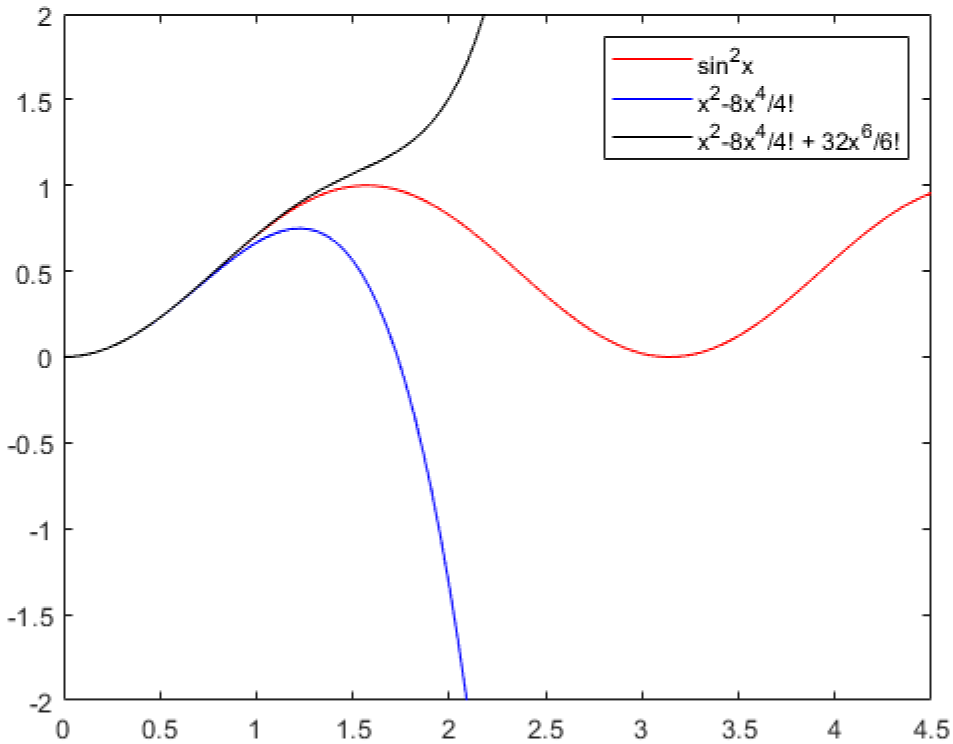
0.0887



Solution - Problem 3 (do not modify this line)

```
x = linspace(0,4.5,100);
y1 = sin(x).^2;
y2 = x.^2-2^3*x.^4/factorial(4);
y3 = x.^2-2^3*x.^4/factorial(4)+ 2^5*x.^6/factorial(6);

plot(x,y1,'r'); hold on;
plot(x,y2,'b');
plot(x,y3,'k'); hold off;
ylim([-2 2]);
legend('sin^2x', 'x^2-8x^4/4!','x^2-8x^4/4! + 32x^6/6!')
```



Solution - Problem 4 (do not modify this line)

```
A = [];
rows = 4; cols =6;

for i = 1:rows
    for j = 1:cols
        A(i,j) = 2*i-3*j;
    end
end
A
```

```
A =

    -1    -4    -7   -10   -13   -16
     1    -2    -5    -8   -11   -14
     3     0    -3    -6    -9   -12
     5     2    -1    -4    -7   -10
```

Solution - Problem 5 (do not modify this line)

```
% part b(i)
```

```
myfunc = @(x)(x^3);
x0 = 0.6; h = x0/100;
dfdx2pt = twoptderi(myfunc,x0,h);
fprintf('Approximate derivative of x^3 at x= 0.6 is %4.4f \n',
 dfdx2pt)
% part b(ii)

myfunc = @(x)(x^3*exp(2*x));
x0 = 2.5; h = x0/100;
dfdx2pt = twoptderi(myfunc,x0,h);
fprintf('Approximate derivative of x^3exp(2x) at x= 2.5 is %4.6f \n',
 dfdx2pt)




function dfdx2pt = twoptderi(myfunc,x0,h)
% dfdx2pt approximates the derivative using
% the two-point central difference formula
% x0 is the point where the derivative is calculated
% h is a number relative to x0
dfdx2pt = (myfunc(x0+h)-myfunc(x0-h))/(2*h);
end
```

```
Approximate derivative of x^3 at x= 0.6 is 1.0800
Approximate derivative of x^3exp(2x) at x= 2.5 is 7427.554645
```

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