

Info 3 Introduction to MATLAB®

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Homework 3 (Solution)

Task 1: functions (3.5pts + 1.5pts)

1. Write a function to calculate the surface and the volume of a cone given by (see Homework 3)

```
function [l_surface, t_surface] = hollow_cylinder (r, R, h)
% This function calculates the lateral surface area and the total surface area
% of a hollow cylinder given by:
% lateral surface=2πh(R+r)
% total surface=2πh(R+r)+2π(R^2-r^2)
% where
% r is the inner radius.
% R is outer radius.
% h is the height

l_surface=2*pi*h*(R+r);
t_surface=2*pi*h*(R+r)+2*pi*(R^2-r^2);

end
```

2. Calculation of the surface and the volume of the indicated cones below using the developed function:

Cone	lateral surface	total surface
1. cylinder 1: $r = 3, R = 5, h = 3$	150.7964	251.3274
2. cylinder 2: $r = 4.5, R = 10, h = 2$	182.2124	683.2964
3. cylinder 3: $r = 20, R = 20.01, h = 0.01$	2.5139	5.0278

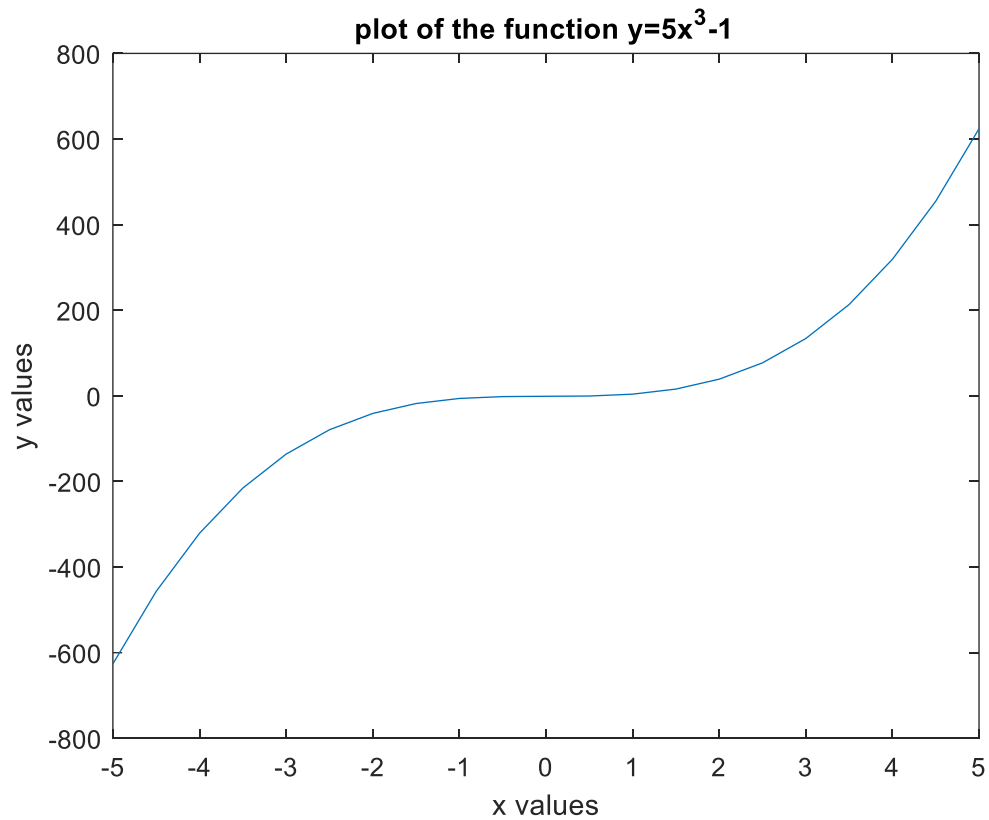
Task 2: Plots (2pts + 5pts + 3pts)

1. Plot the function $y = 5x^3 - 1$ in the interval $[-5, 5]$ arranged by the step 0.5

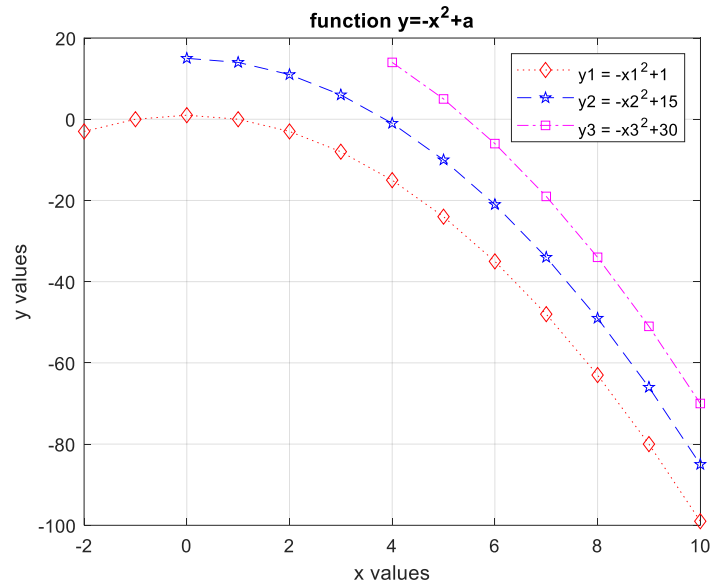
```
% Task 2: Plots
% 1. Plot the function  $y=5x^3-1$  in the interval  $[-5\ 5]$  arranged by the step 0.5
x = -5:0.5:5;
y = 5*x.^3-1;

figure
plot(x, y);
xlabel('x values');
ylabel('y values');
title('plot of the function  $y=5x^3-1$ ');

```



2. Command lines to plot the following figure.



% 2. The command lines to plot the given figure.

```
x1 = -2:10; y1 = -x1.^2+1;
x2 = 0:10; y2 = -x2.^2+15;
x3 = 4:10; y3 = -x3.^2+30;
```

```
figure
plot(x1,y1,'r:d', x2,y2,'b--p', x3,y3,'m-.s');
xlabel('x values');
ylabel('y values');
title('function y=-x^2+a');
legend('y1 = -x1^2+1', 'y2 = -x2^2+15', 'y3 = -x3^2+30');
grid on;
```

3. Replot the curves of the three functions in separate views.

% 3.Replot the curves of the three functions in separate views.

```
figure
subplot(2,2,1)
plot(x1,y1,'r:d');
xlabel('x values');
ylabel('y values');
title('function y = -x1^2+1');
subplot(2,2,2)
plot(x2,y2,'b--p');
xlabel('x values');
ylabel('y values');
title('function y = -x2^2+15');
subplot(2,2,3)
plot(x3,y3,'m-.s');
xlabel('x values');
ylabel('y values');
title('function y = -x3^2+30');
```

