

Plotting Graphs and Pylab Solutions

Proper imports are assumed for all of these solutions.

1.

```
plot([1, 2, 3, 4, 5], [2, 3, 5, -1, 0])  
show()
```

2.

```
plot([1, 1], [2, 8])  
plot([4, -1], [4, 4])  
show()
```

3.

```
x_values = arange(-1, 1.1, 0.1)  
y_values = x_values**2  
plot(x_values, y_values, 'g>--')  
show()
```

4.

```
x_values = arange(0, 1.64, 0.01)  
y_values = x_values * (1 - x_values * 9.8 / 16)  
plot(x_values, y_values)  
xlabel('Horizontal displacement (m)')  
ylabel('Vertical displacement (m)')  
title('Projectile Trajectory')  
show()
```

5.

```
x_values = arange(-10, 10.001, 0.01)
f = []
f_prime = []
f_prime_prime = []
for value in x_values:
    f.append(exp(value**2/2))
    f_prime.append(value * exp(value**2/2))
    f_prime_prime.append((value**2 + 1) * exp(value**2/2))
subplot(3,1,1)
plot(x_values, f)
subplot(3,1,2)
plot(x_values, f_prime)
subplot(3,1,3)
plot(x_values, f_prime_prime)
show()
```

6.

```
x1 = arange(-10, 10.01, 0.01)
x2 = arange(0.01, 10.01, 0.01)
y1 = x1
y2 = x1**2
y3 = []
y4 = []
y5 = []
y6 = []
y7 = []
for element in x1:
    y3.append(exp(element))
for element in x1:
    y4.append(atan(element))
for element in x2:
    y5.append(log(element))
for element in x2:
    y6.append(element**element)
for element in x2:
    y7.append(element**(element**element))
figure(1)
plot(x1,y1)
xlabel('x')
ylabel('y')
title('y = x')
figure(2)
plot(x1,y2)
xlabel('x')
ylabel('y')
title('y = x**2')
figure(3)
plot(x1,y3)
xlabel('x')
ylabel('y')
```

```
title('y = exp(x)')
figure(4)
plot(x1,y4)
xlabel('x')
ylabel('y')
title('y = arctan(x)')
figure(5)
plot(x2,y5)
xlabel('x')
ylabel('y')
title('y = log(x)')
figure(6)
plot(x2,y6)
xlabel('x')
ylabel('y')
title('y = x**x')

figure(7)
plot(x2,y7)
xlabel('x')
ylabel('y')
title('y = x**(x**x)')
show()
```