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Lab 2 Exp 1

Date: 21.03.2022

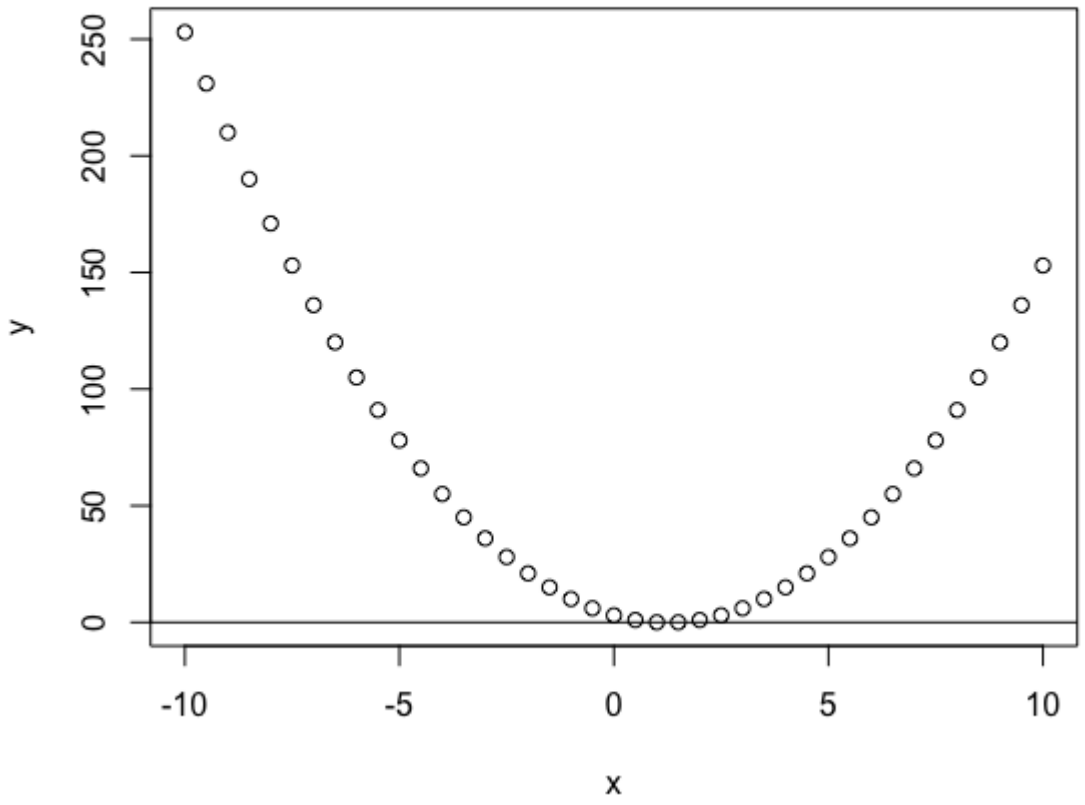
AIM: To solve a Quadratic Equation using R

CODE:

```
# Problem 1:

# Quadratic Equation of One Variable.

a = readline()
b = readline()
c = readline()

a = as.integer(a)
b = as.integer(b)
c = as.integer(c)

x = seq.int(-10,10,.5)
y = a*x^2 + b*x + c

plot(x,y)
abline(0,0)

D = b^2 - 4*a*c

if(D > 0){
  x1 = (-b + sqrt(D)) / (2*a)
  x2 = (-b - sqrt(D)) / (2*a)
  sprintf('Roots of the Qudratic Equation: %s , %s', x1, x2)
}else if(D == 0){
  X = (-b + sqrt(D)) / (2*a)
  sprintf('Root of the Qudratic Equation: %s ', X)
}else{
  print('Qudratic Equation has imaginary root')
}
```

OUTPUT:

```
+   sprintf('Root of the Qudratic Equation: %s ', X)
+ }else{
+   print('Qudratic Equation has imaginary root')
+ }
[1] "Roots of the Qudratic Equation: 1.5 , 1"
```


y
0
50
100
150
200
250
-10
-5
0
5
10
x

Lab 2 Exp 2

Date: 21.03.2022

AIM: A ball is thrown straight up, from 3 m above the ground, with a velocity of 14 m/s. When does it hit the ground? Ignore air resistance, and consider t is time in seconds where Gravity pulls it down, changing its position by about 5 m per second squared.

WAP in R to test the result of the above problem statement, possibly with t=-0.2 and t= 3, the ball hits the ground.

CODE:

```
# Problem Statement:

# A ball is thrown straight up, from 3 m above the ground,
# with a velocity of 14 m/s. When does it hit the ground?
# Ignore air resistance,  and consider t is time in seconds where Gravity pulls it down,
# changing its position by about 5 m per second squared.
# WAP in R to test the result of the above problem statement,
# possibly with t=-0.2 and t= 3 , the ball hits the ground.


# Initilization of Variable
v = 14
g = 10
h0 = 3


t = seq.int(-10,10,.5)
# Formation of Quadratic Equation
h = -(g * t^2)/ 2 + v * t + h0

# Ploting of the Equation
plot(t,h)
abline(0,0)

# Solving the Quadratic Equation
a = -g/2
b = v
c = h0
D = b^2 - 4*a*c

if(D > 0){
  x1 = (-b + sqrt(D)) / (2*a)
  x2 = (-b - sqrt(D)) / (2*a)
  sprintf('Solution to the Problem: %s , %s', x1, x2)
}else if(D == 0){
  X = (-b + sqrt(D)) / (2*a)
  sprintf('Solution to the Problem: %s ', X)
}else{
  print('The given problem has no solution')
}
```

```r
# Checking the Values at given roots
t1 = -0.2
h1 = -(g * t1^2)/ 2 + v * t1 + h0
t2 = 3
h2 = -(g * t2^2)/ 2 + v * t2 + h0

sprintf("The height of the ball at t=-0.2 and t= 3 second respectively is: h=%s, h=%s",h1,h2)
```

OUTPUT:

```
[1] "Solution to the Problem: -0.2 , 3"
>
>
>
> t1 = -0.2
> h1 = -(g * t1^2)/ 2 + v * t1 + h0
>
> t2 = 3
> h2 = -(g * t2^2)/ 2 + v * t2 + h0
>
> sprintf("The height of the ball at t=-0.2 and t= 3 second respectively is: h=%s, h=%s",h1,h2)
[1] "The height of the ball at t=-0.2 and t= 3 second respectively is: h=-4.44089209850063e-16, h=0"
```