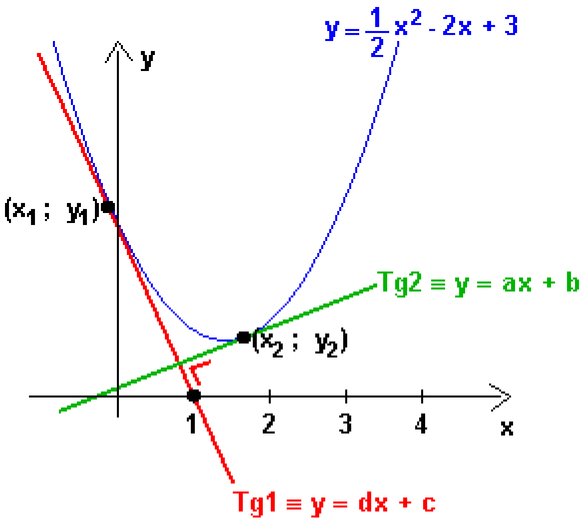
EXPERIMENT 2

AIM

Plot the graph of $y^2=4x$ and its tangent at P(4,4).Also,obtain radius of curvature ρ at P.For the varying P on the curve show that $(SP)^2/\rho^2$ is constant where S is focus of parabola.

NAME: Nitya Mittal (2k19/MC/089), DATE:21/09/2020

THEORY:



SOURCE CODE

```
clear all;
close all;
syms y(x) roc(x)


%initializing y
y=sqrt(4*x);


%differentiating y
Dy = diff(y);
D2y = diff(y,x,2);


%finding the radius of curvature
roc(x) = ((1+Dy^2)^1.5)/D2y


%radius of curvature for P(4,4)
disp("The Radius of Curvature at P(4,4): ")
```

```
disp(roc(4))


%initializing x and y for focus (1,0)
xfoc=1;
yfoc=0;


disp("The Ratio for Varying P(i,j) :")
for j=1:6
    i=j*j/4;
    dist3 = ((xfoc-i)^2 + (yfoc-j)^2)^1.5;
    roc2 = (roc(i))^2;
    disp(dist3/roc2)
end


%plotting function declaration
y=2*(x^.5);




fplot(y,[-1,10],'blue')
hold on
fplot(-y,[-1,10],'blue')


%value of x for Tangent
xtgt=4;


Dy(x)= diff(y);


%tangent=slope*x+offset
%slope=Dy
slope=Dy(xtgt);


%value of y for Tangent
ytgt=sqrt(4*xtgt);


hold on
%plotting the tangent point
plot(xtgt,ytgt,'r*');


syms ytangentline
%plotting the tangent line
ytangentline=slope*(x-xtgt)+ ytgt;
fplot(ytangentline)
```

OUTPUT:

```
>> parabola

roc(x) =

-2*x^(3/2)*(1/x + 1)^(3/2)

The Radius of Curvature at P(4,4):
-10*5^(1/2)

The Ratio for Varying P:
1/4

1/4

1/4

1/4

1/4

1/4
```