MathWorks® | Training Services

Course Completion Certificate

Sanjay Gadde

has successfully completed 100% of the self-paced training course

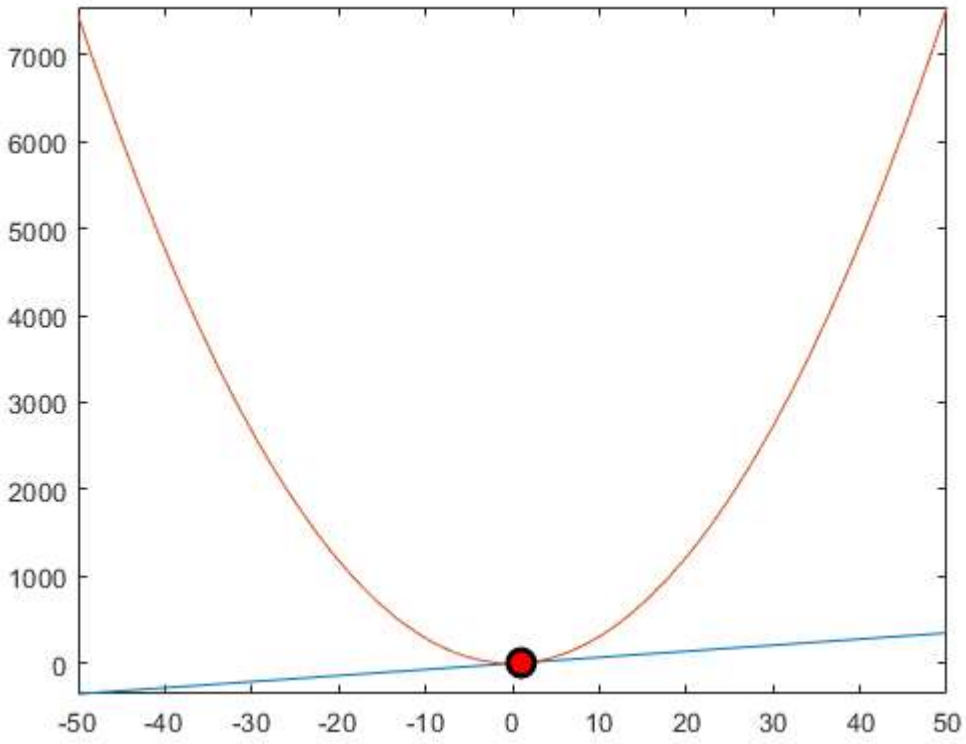
MATLAB Onramp

DIRECTOR, TRAINING SERVICES

04 January 2021

```
%Name: Gadde Sanjay
%Registration Number: 20MIS7004
%question-1: write the equation of tangent to the curve f=3*x^2+x-2 at the point
%point(1,5) on the curve plot graph of the tangent and the curve use symbolic variable
syms x;
%Declare f(x)
f=3*x^2+x-2

%Differentiate f(x)
df=diff(f)

6*x + 1
%Gradiant at (x0,y0)
x0=1,y0=5;
m=subs(df,x0)
%compute c(y-axis Intercept)
c=y0-m*x0;
%declare
tan_eqn=m*x+c
%plot f(x) and tangent at(x0,y0)
fplot(tan_eqn, [-50 50]);
hold on;
fplot(f, [-50 50])
plot(x0,y0,'o','Linewidth',2,'MarkerEdgeColor','k','MarkerFaceColor','r','MarkerSize',10)
```

```
f =

3*x^2 + x - 2


df =

6*x + 1


ans =

6*x + 1


x0 =

     1


m =

7


tan_eqn =

7*x - 2
```



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```
% Question : if a particle moves in space according to the function
% x(t)=t^3-4t^2 where t is time in seconds and x is displacement from
 the
% origin in centimetres(with positive to the right)
% a) find the acceleration of the particle at t= 2s.
% b) determine at displacement(s)from the origin the particle is at
 rest .
% c) find the maximum velocity of the particle.
syms t;
% Declare f(t)
f=t^3-4*t^2;
% Differentiate f(t) twice
df =diff(f,2)

% a) acceleration of the particle at t=2s
a=subs(df,2)
% b) differentiate f(t) to get velocity
df1 = diff(f)
df1==8
y=solve(df1,t)
b= subs(f,y)
%c) maximum velocity
df1==8
c= solve(df1,t)
vmax = subs(df1,8/3)
```

```
df =

6*t - 8


a =

4


df1 =

3*t^2 - 8*t


ans =

3*t^2 - 8*t == 8


y =

  0
8/3
```

```
b =

      0
-256/27


ans =

3*t^2 - 8*t == 8


c =

  0
8/3


vmax =

0
```

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```
%Question-3
%an electron moves such that its velocity function with respect to
 time is
%v(t)=e^(2t-2),where t is time in seconds and v is velocity in meters
 per
%second:
%a)what is the acceleration of the electron at t=10s?
syms e;
syms t;
%Declare v(x)
v = e^(2*t-2)
%Differentiate v(x)
dv = diff(v)
%acceleration of the electron at t=10s
a = subs(dv,10)
```

```
v =

e^(2*t - 2)


dv =

2*e^(2*t - 2)*log(e)


a =

2*e^18*log(e)
```

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```
% Question : if a particle moves in space according to the function
% x(t)=t^3-4t^2 where t is time in seconds and x is displacement from
 the
% origin in centimetres(with positive to the right)
% a) find the acceleration of the particle at t= 2s.
% b) determine at displacement(s)from the origin the particle is at
 rest .
% c) find the maximum velocity of the particle.
syms t;
% Declare f(t)
f=t^3-4*t^2;
% Differentiate f(t) twice
df =diff(f,2)

% a) acceleration of the particle at t=2s
a=subs(df,2)
% b) differentiate f(t) to get velocity
df1 = diff(f)
df1==8
y=solve(df1,t)
b= subs(f,y)
%c) maximum velocity
df1==8
c= solve(df1,t)
vmax = subs(df1,8/3)
```

```
df =

6*t - 8


a =

4


df1 =

3*t^2 - 8*t


ans =

3*t^2 - 8*t == 8


y =

  0
8/3
```

```
b =

      0
-256/27


ans =

3*t^2 - 8*t == 8


c =

  0
8/3


vmax =

0
```

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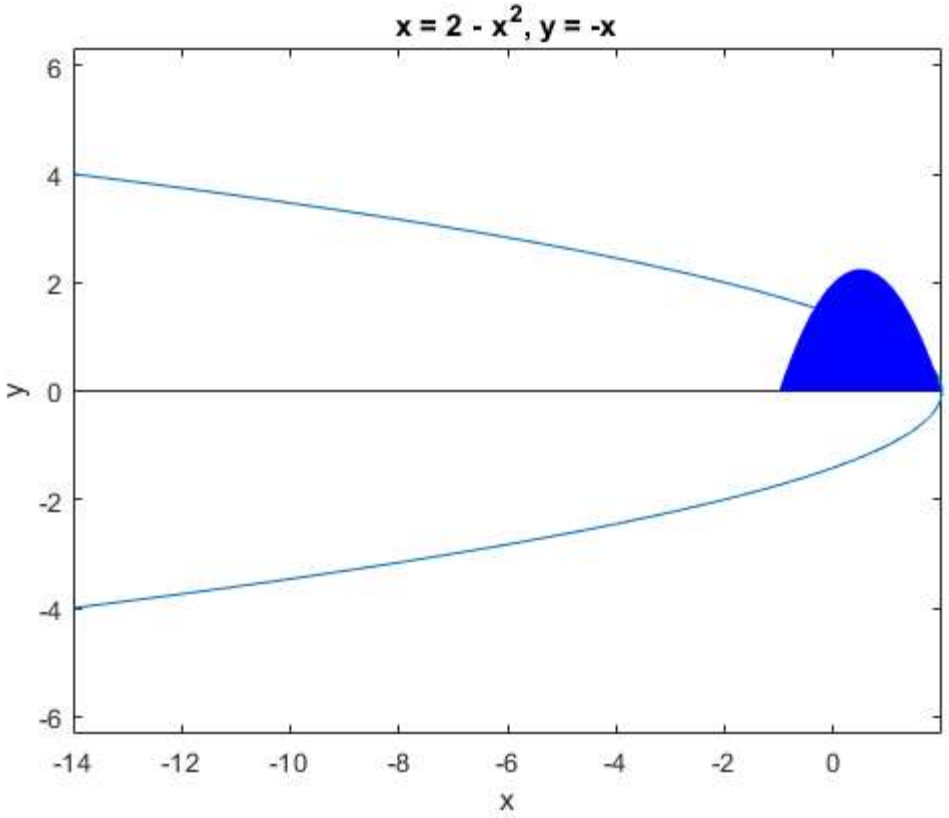
```
%Gadde Sanjay
%Reg, No:20MIS7004
%1. Find the area of the region enclosed by the parabola y=2-x^2 and the
%line y=-x
syms x
plot_range=[-4,4];
f1=2-x^2;
f2=-x;
ezplot(f1,f2,plot_range);
hold on
int_limit=[-1,2];
int_f1=int(f1);
int_f2=int(f2);
f3=f1-f2;
int_val_lix=int(f3,int_limit(1),int_limit(2));
range=int_limit(1):0.1:int_limit(2);
z=subs(f3,range);
area(range,z,'Facecolor',[0,0,1],'Linestyle','none');
```



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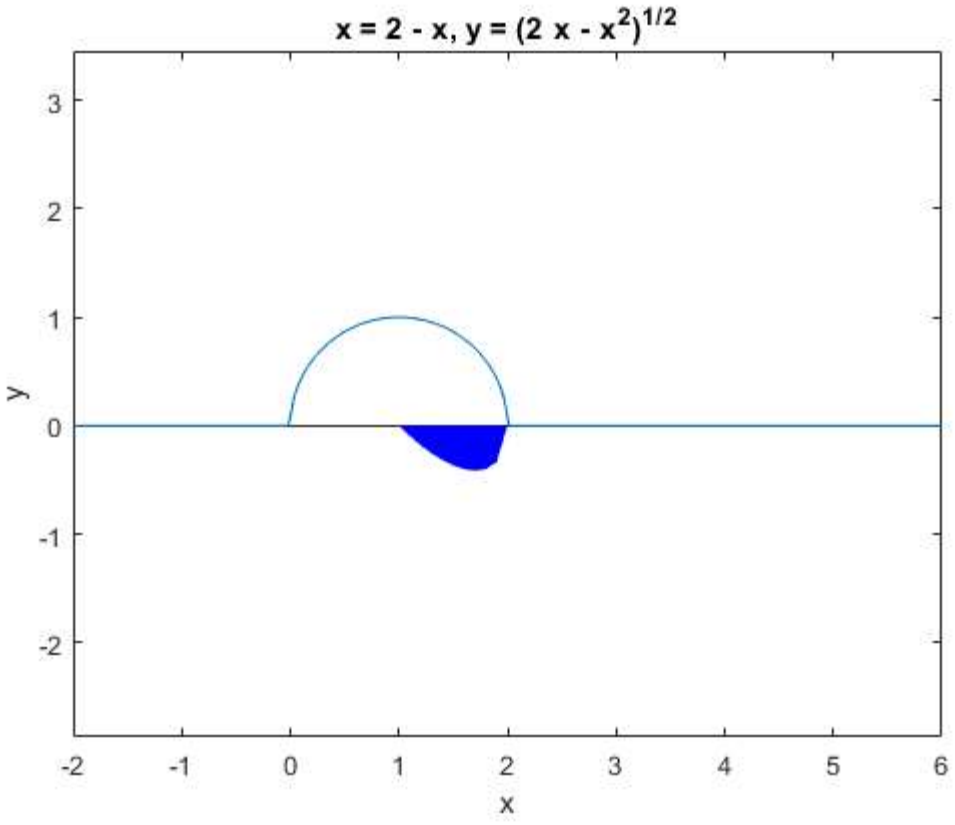
```
%2. Find the area of the region bounded beow by the line y=2-x and above by
%the curve y=sqrt(2*x_x^2).
syms x
f1=2-x;
f2=sqrt(2*x-x^2);
f3=f1-f2;
plot_range=[-4,4];
ezplot(f1,f2,plot_range);
hold on
int_limit=[1,2];
int_f1=int(f1);
int_f2=int(f2);
int_val_lim=int(f3,int_limit(1),int_limit(2));
range=int_limit(1):0.1:int_limit(2);
z=subs(f3,range);
area(range,z,'Facecolor',[0,0,1],'Linestyle',"none");
```

```
Warning: Imaginary parts of complex X and/or Y arguments ignored.
```



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```
%Name:Gadde Sanjay
%Reg No: 20MIS7004
%Q1.Find the extreme values of f(x,y)=x^2+y^2-4y+9
syms x y
f=x^2+y^2-4*y+9
r=diff(f,x,2)
s=diff(f,2)
t=diff(f,y,2)
r*t-s^2
%since, r>0 f has min value
%extreme values of f
a=diff(f,x)
a==0
solve(f,x)
b=diff(f,y)
b==0
solve(b,y)
ezsurf(f)
```

```
f =

x^2 + y^2 - 4*y + 9


r =

2


s =

2


t =

2


ans =

0


a =

2*x


ans =

2*x == 0


ans =

-(- y^2 + 4*y - 9)^(1/2)
 (- y^2 + 4*y - 9)^(1/2)


b =
```

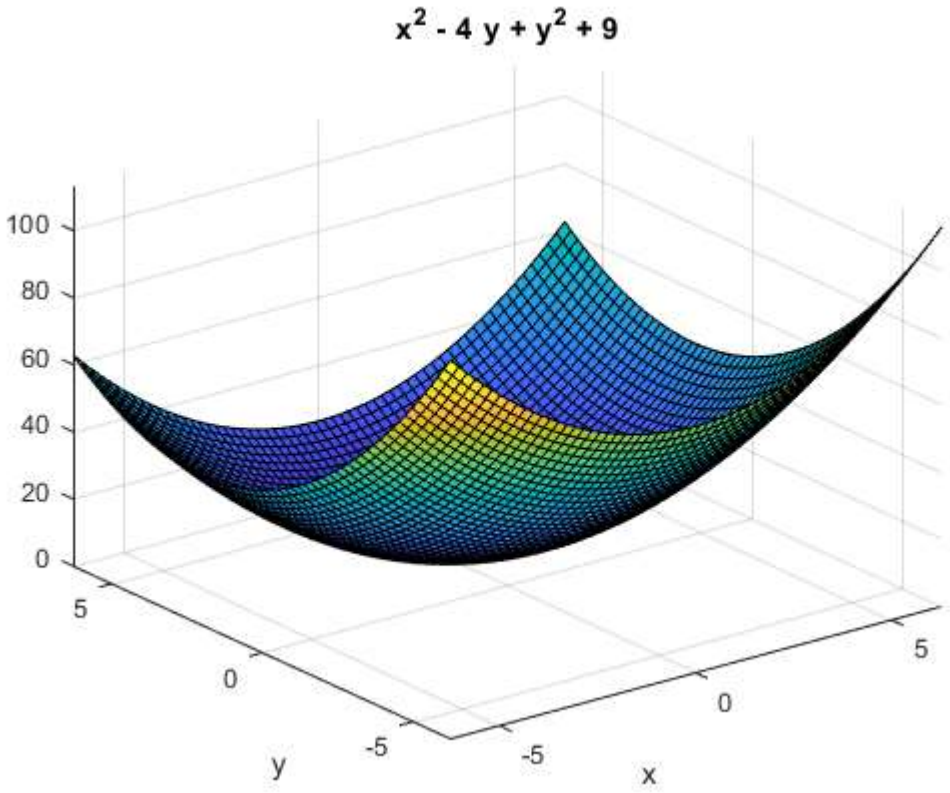
```
2*y - 4
```

```
ans =
```

```
2*y - 4 == 0
```

```
ans =
```

```
2
```



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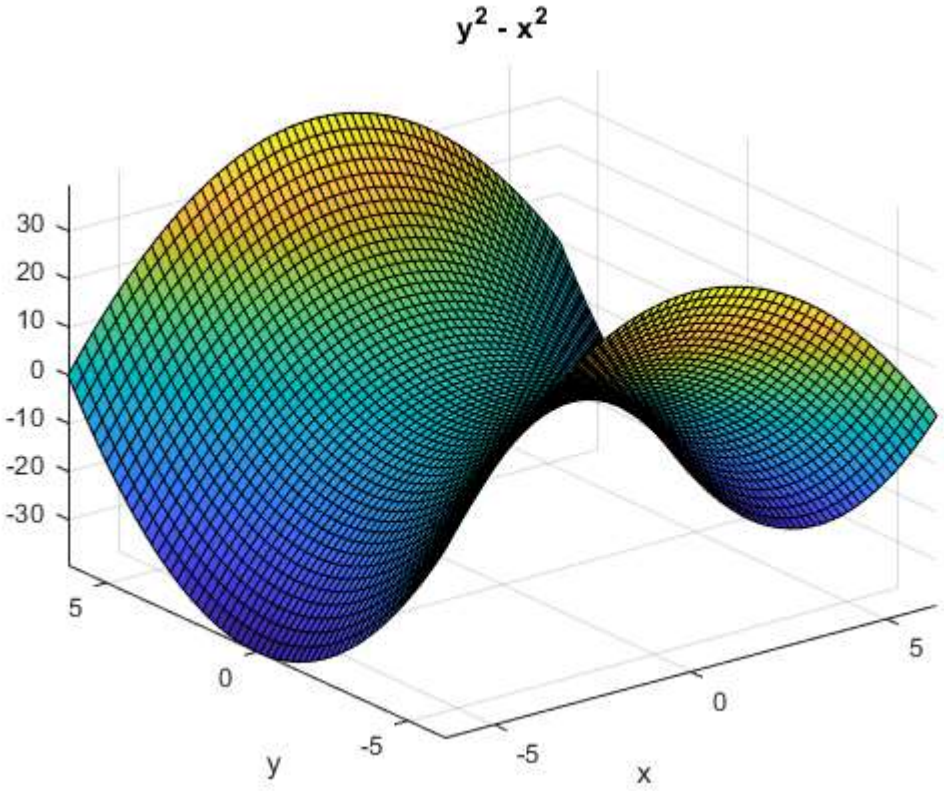
```
%find the local extreme valueof f(x,y)=y^2-x^2
syms x y
f=y^2-x^2
r=diff(f,x,2)
s=diff(f,2)
t=diff(f,y,2)
r*t-s^2
% since, r<0 has max value
%extreme value of f
a=diff(f,x)
a==0
b=diff(f,y)
b==0
solve(b,y)
ezsurf(f)
hold on
f=subs(f,a,b);
```

```
f =

y^2 - x^2


r =

-2


s =

-2


t =

2


ans =

-8


a =

-2*x


ans =

-2*x == 0


b =

2*y


ans =

2*y == 0
```

```
ans =

0
```



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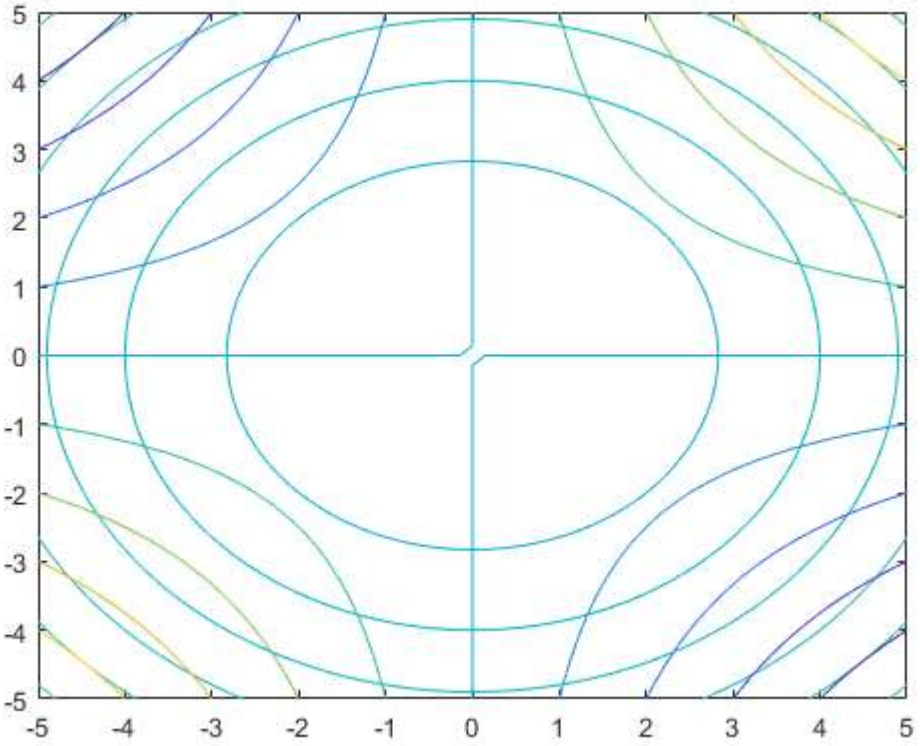
```
%find the greatest and smallest values that the function f(x,y)=xy
%takes on the ellipse(x^2/8)+(y^2/2)=1
syms x y k
f=x*y
g=(x^2)/8+(y^2)/8-1
h=f+g*g
dhx=diff(h,x)
dhy=diff(h,y)
dhk=diff(h,k)
[xc,yc,kc]=solve([dhx,dhy,dhk],[x,y,k]);
f_val=subs(f,{x,y},{xc,yc});
[maxv, i]=max(f_val)
[minv, j]=min(f_val)
fprintf('The function has a point of maxima at(%d,%d)/n',xc(i),yc(i))
fprintf('The function has a point of maxima at(%d,%d)/n',xc(j),yc(j))
fcontour(g)
hold on
fcontour(f)
```

```
f =

x*y


g =

x^2/8 + y^2/8 - 1


h =

(x^2/8 + y^2/8 - 1)^2 + x*y


dhx =

y + (x*(x^2/8 + y^2/8 - 1))/2


dhy =

x + (y*(x^2/8 + y^2/8 - 1))/2


dhk =

0


maxv =

0


i =

     3


minv =
```

```
-12

j =

     1

The function has a point of maxima at(0,0)/nThe function has a point of maxima at(3,-3)/n
```



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```
% Name:Gadde Sanjay
%Reg No:20MIS7004
%A moving body is opposed by a force per unit mass of values CI and
%resistance per unit mass of value bv^3.Where x and v are the displacement
%and velocity of the particle at the instant.Find the velocity of the
%particle in terms of the displacement, if it starts from the rest
syms v
syms b c e A1
P=v*(diff(v,x))+b*v^2+c*x
Q=(v^2)*e^(2*b*x);
Q1=int((-2*c*x*e^(2*b*x)),x)
Q2=Q+Q1
%solving by values as v=0and x=0
A=subs(subs(subs(Q2,v,0),x,0),e,10)
%putting value for equation
P1=v^2+(c*x/b) -(c/(2*b^2))-A1*e^(-2*b*x)
solution_v=subs(P1,A1,A)
```

```
P =

b*v^2 + c*x


Q1 =

-(c*e^(2*b*x)*(2*b*x*log(e) - 1))/(2*b^2*log(e)^2)


Q2 =

e^(2*b*x)*v^2 - (c*e^(2*b*x)*(2*b*x*log(e) - 1))/(2*b^2*log(e)^2)


A =

c/(2*b^2*log(10)^2)


P1 =

v^2 - A1/e^(2*b*x) - c/(2*b^2) + (c*x)/b


solution_v =

v^2 - c/(2*b^2) + (c*x)/b - c/(2*b^2*e^(2*b*x)*log(10)^2)
```

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```
% Name: Gadde Sanjay
% Reg  No:20MIS7004
%A resistance of 100 ohm an inductance of 0.5 in a series with a battery of
%20 volts find the current in the circuit at t=0.5sec if i=0 at t=0
syms i t E R L e c E1;
E1=L*(diff(i,t))+R*t;
% integrating we get
P=i*e^(int((R/L),t))
Q=int(e^(R/L),t)
%we have function
i=(E/R)*(1-e^(-R*t/L))
R=100;
L=0.5;
E=20;
t=0.5;
% substituting values for "i"
i=(20/100)*(1-e^(-100*0.5/0.5))
```

```
P =

e^((R*t)/L)*i


Q =

e^(R/L)*t


i =

-(E*(1/e^((R*t)/L) - 1))/R


i =

1/5 - 1/(5*e^100)
```

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