LEAST SQUARE APPROXIMATION

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Q FOR LINEAR

ANSWER CODE:

```
n= input("Enter the number of data points : ");
x= input("Data Points : ");
f= input("Value of f(x) : ");
A= zeros(2,2);
B= zeros(2,1);
A(1,1)=n;
for i=1:n
    A(1,2)= A(1,2)+x(i);
    A(2,2)= A(2,2) + (x(i)*x(i));
    B(1)= B(1)+f(i);
    B(2)= B(2) +(f(i)*x(i));
end
A(2,1)= A(1,2);
Solution= linsolve(A,B);
fprintf("Value of a : %0.5f\nValue of b :
%0.5f",Solution(1),Solution(2));
```

```
>> straight_line
Enter the number of data points : 5
Data Points : [-2 -1 0 1 2]
Value of f(x) : [15 1 1 3 19]
Value of a : 7.80000
Value of b : 1.00000>>
```

Q2 FOR QUADRATIC

```
n= input("Enter the number of data points : ");
x= input("Data Points : ");
f= input("Value of f(x) : ");
A= zeros(3,3);
B= zeros(3,1);
A(1,1)=n;
for i=1:n
    A(1,2)= A(1,2)+x(i);
```

```
    A(2,2)= A(2,2) + (x(i)*x(i));
    A(2,3)= A(2,3)+ (x(i)*x(i)*x(i));
    A(3,3)=A(3,3)+(x(i)*x(i)*x(i)*x(i));
    B(1)= B(1)+f(i);
    B(2)= B(2) +(f(i)*x(i));
    B(3)=B(3)+ (f(i)*x(i)*x(i));
end
A(2,1)= A(1,2);
A(1,3)= A(2,2);
A(3,1)=A(2,2);
A(3,2)=A(2,3);
Solution= linsolve(A,B);
fprintf("Value of a : %0.5f\nValue of b : %0.5f\nValue of c :
%0.5f",Solution(1),Solution(2),Solution(3));
```

```
Enter the number of data points : 5
Data Points : [-2 -1 0 1 2]
Value of f(x) : [15 1 1 3 19]
Value of a : -1.05714
Value of b : 1.00000
Value of c : 4.42857>>
```

Q FOR EXPONENTIAL

```
n= input("Enter the number of data points : ");
x= input("Data Points : ");
f= input("Value of f(x) : ");
A= zeros(2,2);
B= zeros(2,1);
A(1,1)=n;
for i=1:n
    A(1,2)= A(1,2)+log(x(i));
    A(2,2)= A(2,2) + (log(x(i))*log(x(i)));
    B(1)= B(1)+log(f(i));
    B(2)= B(2) +(log(f(i)) * log(x(i)));
end
A(2,1)= A(1,2);
Solution= linsolve(A,B);
fprintf("Value of a : %0.5f\nValue of b :
%0.5f",exp(Solution(1)),Solution(2));
```

```
Enter the number of data points : 4
Data Points : [2 3 4 5]
Value of f(x) : [27.8 62.1 110 161]
Value of a : 7.37990
Value of b : 1.93016>>
```

Q SQUARE ROOT

```
clc;
clear all;
x=[0.1 0.2 0.4 0.5 1 2];
y=[21 11  7 6 5 6];
n=length(x);

sumyrtx=0; sumx=0; sumxinv=0; sumxrtinv=0; sumxsqrinv=0;sumyx=0;
 for i=1:n
     sumyrtx=sumyrtx+(y(i)*(x(i).^(0.5)));
     sumx=sumx+x(i);
     sumxinv=sumxinv+(1/x(i));
     sumxrtinv=sumxrtinv+(1/(x(i).^(0.5)));
     sumxsqrinv=sumxsqrinv+(1/(x(i)*x(i)));
     sumyx=sumyx+(y(i)/x(i));
 end
 matt1=[sumx sumxrtinv; sumxrtinv sumxsqrinv];
 matt2=[sumyrtx; sumyx];
 val=matt1\matt2;
 disp(val)
 fprintf('The equation best fitting the curve is %fsqrt(x) + %f/x'
,val(1), val(2));
```

```
Command Window
The equation best fitting the curve is 3.281824sqrt(x) + 1.973267/x>>
```