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PROGRAM – 6

AIM: To calculate correlation using R.

```
x <- c(10, 20, 30, 40, 50)

y <- c(15, 25, 35, 45, 55)

correlation_value <- cor(x, y)

print(paste("Correlation coefficient:", correlation_value))
```

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Output

```
[1] "Correlation coefficient: 1"

=== Code Execution Successful ===
```

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PROGRAM – 7

AIM: Write a program to fit regression lines to the given data set.

```
x <- c(1, 2, 3, 4, 5)

y <- c(2, 4, 5, 4, 5)

model <- lm(y ~ x)

print(summary(model))

plot(x, y, main="Regression Line", xlab="X values", ylab="Y values", col="blue", pch=16)

abline(model, col="red")
```

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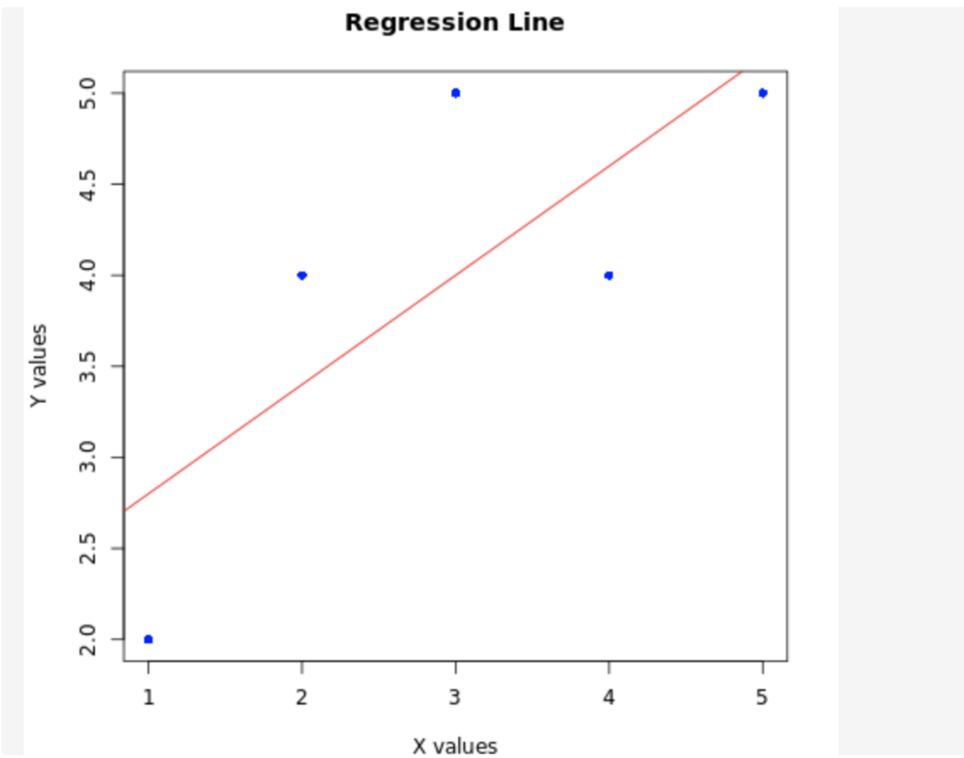
```
Call:
lm(formula = y ~ x)

Residuals:
   1    2    3    4    5
-0.8  0.6  1.0 -0.6 -0.2

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   2.2000     0.9381   2.345    0.101
x             0.6000     0.2828   2.121    0.124

Residual standard error: 0.8944 on 3 degrees of freedom
Multiple R-squared:    0.6,     Adjusted R-squared:  0.4667
F-statistic:   4.5 on 1 and 3 DF,  p-value: 0.124


[Execution complete with exit code 0]
```



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PROGRAM – 8

AIM: Plotting functions and finding their derivatives in MATLAB.

```
syms x

f = sin(x) + x^2;

f_prime = diff(f, x);

x_vals = linspace(-10, 10, 400);

f_func = matlabFunction(f);

f_prime_func = matlabFunction(f_prime);

y_vals = f_func(x_vals);

y_prime_vals = f_prime_func(x_vals);

figure;

plot(x_vals, y_vals, 'b', 'LineWidth', 2);

hold on;

plot(x_vals, y_prime_vals, 'r', 'LineWidth', 2);

xlabel('x');
ylabel('y');
title('Function and Its Derivative');
legend('f(x) = sin(x) + x^2', 'f''(x) = derivative of f(x)', 'Location', 'Best');
grid on;
hold off;
```

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178-IT-C

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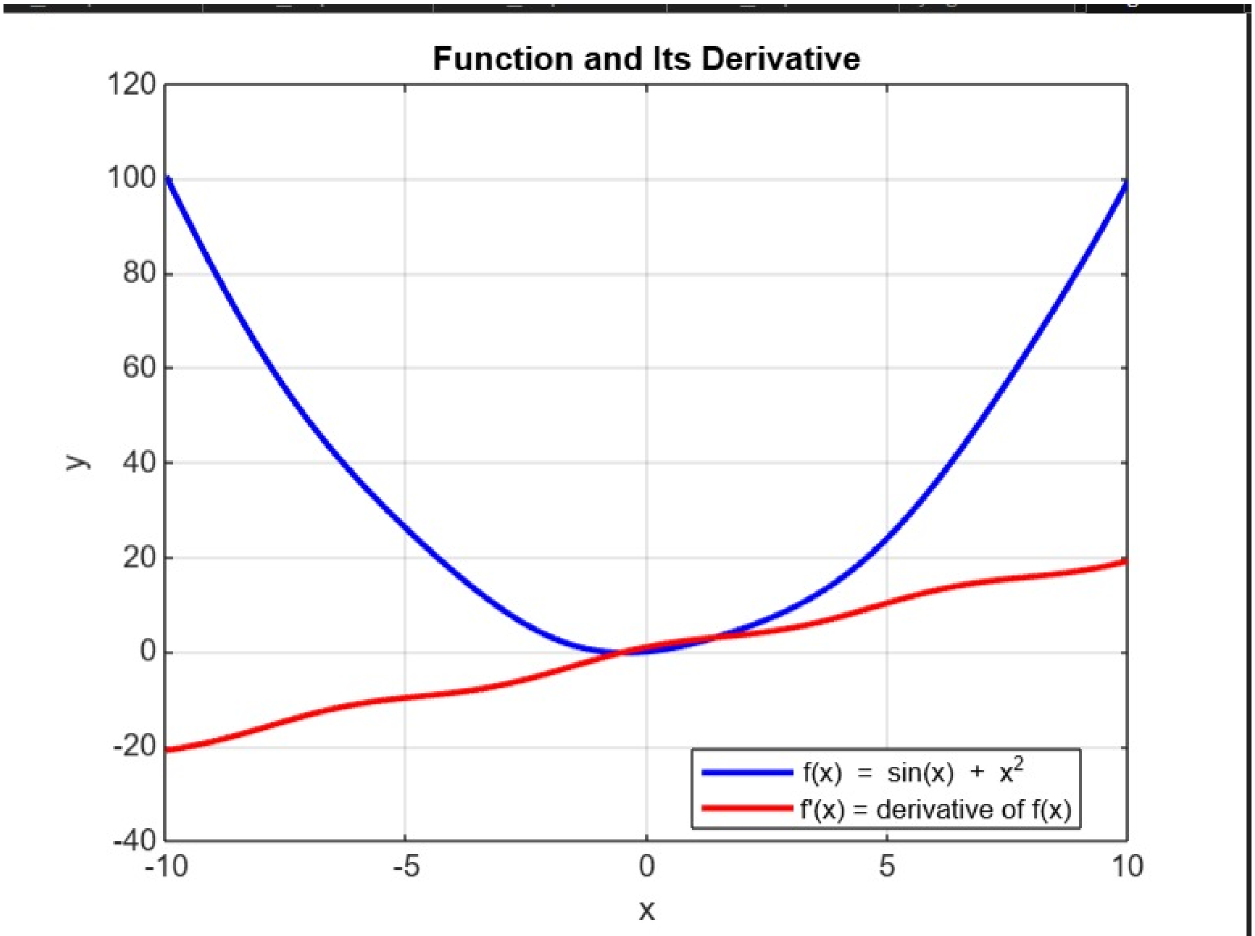

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PROGRAM – 9

AIM: Finding the eigenvalues and eigenvectors in MATLAB.

```
A = [2 1; 1 2];

[V, D] = eig(A);

disp('Eigenvalues:');

disp(diag(D));

disp('Eigenvectors:');

disp(V);
```

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OUTPUT

```
Eigenvalues:
   1
   3
Eigenvectors:
  -0.7071   0.7071
   0.7071   0.7071

[Execution complete with exit code 0]
```

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PROGRAM – 10

AIM: Write a program to find the row-reduced echelon form of a matrix in MATLAB.

```
A = [2 4 -2; 4 9 -3; -2 -3 7];
disp('Original Matrix A:');
disp(A);
rref_A = rref(A);
disp('Row-Reduced Echelon Form:');
disp(rref_A);
 A(1, :) = A(1, :) / 2;
A(2, :) = A(2, :) - A(1, :) * 4;
A(3, :) = A(3, :) + A(1, :) * 2;
 A(2, :) = A(2, :) / A(2, 2);
A(1, :) = A(1, :) - A(2, :) * A(1, 2);
A(3, :) = A(3, :) - A(2, :) * A(3, 2);
 A(3, :) = A(3, :) / A(3, 3);
A(1, :) = A(1, :) - A(3, :) * A(1, 3);
A(2, :) = A(2, :) - A(3, :) * A(2, 3);
disp('Final RREF:');
disp(A);
```

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OUTPUT

```
Original Matrix A:
   2   4  -2
   4   9  -3
  -2  -3   7
Row-Reduced Echelon Form:
   1   0   0
   0   1   0
   0   0   1
Final RREF:
   1   0   0
   0   1   0
   0   0   1

[Execution complete with exit code 0]
```