MATLAB (**MAT**rix **LAB**oratory) for Absolute Beginners *

1 Defining Variables & Basic Arithmetic

To create a variable, use the = operator.

```
% Define variables
a = 10;
b = 3;
c = a * b     % The result (30) will display in the Command Window
a = a^2       % Now a is redefined as 10 squared
d = sqrt(5)   % d is the square root of 5
```

Pro Tip: A semicolon (;) at the end of a line performs the calculation but hides the output from the screen. To multiply two numbers, you have to use the * operator.

2 Creating Matrices

Matrices are the building blocks of MATLAB. Use **square brackets** to define them:

- Use **spaces** to separate numbers in a row.
- Use **semicolons** to start a new row.

```
% Create a 2x2 matrix
A = [1 2; 3 4]
B = [5 6; 7 8]
```

3 Matrix Multiplication

In MATLAB, the * operator performs standard linear algebra matrix multiplication (row-by-column).

$$C = A \times B$$

```
% Standard matrix multiplication
C = A * B
```

4 Solving Linear Systems (The Backslash)

One of MATLAB's most powerful features is solving systems of linear equations in the form $A\mathbf{x} = \mathbf{b}$. Instead of calculating an inverse, we use the **backslash operator** (\), also known as *mldivide*. To find the vector x:

```
% Solve for x in the equation Ax = b
b = [-3;-5]
x = A\b
```

Note: While you could mathematically use `inv(A)*b`, the backslash operator is faster and more accurate for computers to process.

5 Summary Checklist

Task	MATLAB Command
Assign a Variable	`y = 5`
Create a Matrix	`A = [1, 2; 3, 4]`
Create a Column Vector	`v = [1; 2; 3]`
Matrix Multiplication	`A * B`
Solving Linear Systems (Ax = b)	`x = A\b`

*Created with the assistance of Google Gemini.