📘 1. Constructing Tables of Values and Drawing Graphs

Function types to consider:

- Polynomial functions: $y = ax^n$
- Exponential functions: $y = ab^x + c$
- Other basic forms: $n = -2, -1, -\frac{1}{2}, 0, \frac{1}{2}, 1, 2, 3$

✅ Example 1: Polynomial Function

Function: $y = x^3 + x - 4$

Step 1: Table of values

x	$y = x^3 + x - 4$
-2	$(-8) + (-2) - 4 = -14$
-1	$(-1) + (-1) - 4 = -6$
0	$0 + 0 - 4 = -4$
1	$1 + 1 - 4 = -2$
2	$8 + 2 - 4 = 6$

Step 2: Plot the graph

Use the table to draw points and connect smoothly.

✅ Example 2: Rational Function

Function: $y = \frac{2x+3}{x^2}$

Pick values avoiding $x = 0$ (as it's undefined):

x	$y = \frac{2x+3}{x^2}$
-3	$\frac{-6+3}{9} = -\frac{1}{3}$
-1	$\frac{-2+3}{1} = 1$
1	$\frac{2+3}{1} = 5$
2	$\frac{4+3}{4} = \frac{7}{4}$

Plot these and sketch asymptotes where needed.

✅ Example 3: Exponential Function

Function: $y = \frac{1}{4} \times 2^x$

x	y
-2	$\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$
-1	$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$
0	$\frac{1}{4} \times 1 = \frac{1}{4}$
1	$\frac{1}{4} \times 2 = \frac{1}{2}$
2	$\frac{1}{4} \times 4 = 1$

Plot and note the curve shape: it increases rapidly after $x = 1$ and flattens near $y = 0$ as $x \to -\infty$.

📘 2. Solving Equations Graphically

You can **solve equations** by finding:

- **Roots** (where the graph crosses the x-axis)
- **Intersections** of two graphs

✅ Example: Solve $x^3 + x - 4 = 0$

Draw the graph of $y = x^3 + x - 4$ and find the x-value(s) where the graph cuts the x-axis. These are the **solutions**.

✅ Example: Find where $y = x^2$ and $y = 2x + 3$ intersect

Plot both graphs on the same axes. The x-values where the graphs meet are the **solutions to**:

$$x^2 = 2x + 3 \Rightarrow x^2 - 2x - 3 = 0$$

📘 3. Exponential Growth and Decay

Growth: $y = ab^x$, where $b > 1$

Decay: $y = ab^x$, where $0 < b < 1$

✅ Example: Exponential Growth

Function: $y = 2^x$

As x increases, y increases rapidly. Plot values for $x = -2$ to $x = 3$ to see this.

✅ Example: Exponential Decay

Function: $y = 100 \times (0.5)^x$

This represents halving over time (e.g., radioactive decay or depreciation).