

Drawing Exponential Graphs



Key idea

Each step multiplies by the same factor: base > 1 grows, base between 0 and 1 decays.

The curve nears a horizontal asymptote but never crosses it.

Method

1. Pick $x = -2, -1, 0, 1, 2$.
2. Substitute to make a table.
3. Plot, then join smoothly.

Example: $y = 2^x$

$(-1, \frac{1}{2}), (0, 1), (1, 2), (2, 4)$

Rises quickly; asymptote $y = 0$.

Common mistake

Do not join the points with straight segments.

Exponential graphs are smooth curves.



Shifting Up and Down



Key idea



$y = \text{base}^x + c$ has the **same shape** as base^x , moved c up (or down).

The asymptote moves to $y = c$.

Example: $y = 2^x + 3$



Same shape as 2^x , shifted up 3.
Asymptote becomes $y = 3$.

Common mistake

With a vertical shift, do not leave the asymptote at $y = 0$.
Move the asymptote with the graph.



= copy this into your book. Boxes without a pencil are just to read.