

A straight line to which a given curve eventually gets as close as we like, and stays close, is called an *asymptote* to the curve.

For example:

- For the graph of $y = \frac{1}{x}$, the x -axis and y -axis are both asymptotes: the curve gets as close as we like to the x -axis as x tends towards ∞ or $-\infty$, and as close to the y -axis as we like as x tends to zero.
- For the graph of $y = \ln(x)$ (where $x > 0$), the y -axis is an asymptote: the curve gets as close as we like to it as x tends towards zero.
- For the graph of $y = 2$, the line $y = 2$ is an asymptote: the curve $y = 2$ (actually a straight line) is as close as we like to itself as x tends towards ∞ .
- For the graph of $y = \frac{\sin x}{x}$, the x -axis is an asymptote: as x tends towards ∞ or $-\infty$, even though the graph crosses the x -axis infinitely often, the curve gets as close as we like to the x -axis and stays close.

