Graphing Rational Functions: Guided Notes

# Definitions

Rational function: 

Vertical asymptote: a line that a curve approaches and **never** crosses, because we can't divide by zero

Horizontal asymptote: a line with a slope
of zero that the curve approaches and **sometimes** crosses*\**

Slant (oblique) asymptote: a line with a slope other than zero (and is not undefined) that the curve approaches and **sometimes** crosses*\**

*\*The curve is allowed to cross horizontal and slant asymptotes.*

* Rational functions can have 0, 1, 2, ... vertical asymptotes.
* Rational functions can have 0 or 1 horizontal asymptotes.
* Rational functions can have 0 or 1 slant asymptotes.

**How to Graph a Rational Function**

**Step 1)** Find the asymptote(s).

* If the degree on the top is greater than the degree on the bottom, then the ratio for a horizontal asymptote would be a number over zero, which is undefined. Because of this, there is **no horizontal asymptote** when **.
* If the degree on the top is only 1 greater than the degree on the bottom, then you have a **slant asymptote**.

**Step 2)** Sketch the asymptote(s) with dashed lines.

* Do not worry about sketching slant asymptotes at this time.

**Step 3)** Make a table.

* Pick **-values based on the vertical asymptote(s).
* If there is no vertical asymptote, then let ** be the middle number in your table.

**Step 4)** Plot points and connect dots.

# Examples

Graph each function. Be sure to label the asymptote(s).

**1)** 

**2)** 