Recall that \( f(x) = 4 - x^2 \) and \( g(x) = x + 1 \). To find all values of \( x \) for which \( \frac{f(x)}{g(x)} = 4 \), we simply replace the functions by their formulas and solve:

\[
\frac{4 - x^2}{x + 1} = 4.
\]

We multiply both sides of the equation by \( x + 1 \) to obtain

\[
4 - x^2 = 4(x + 1) = 4x + 4.
\]

This simplifies to \( x^2 = -4x \), which has two solutions: \( x = 0 \) and \( x = -4 \).

To find an inverse function \( y = f^{-1}(x) \) for the function \( f(x) = 4 - x^2 \), we need to restrict the domain of \( f(x) \) to obtain a one-to-one function. We can restrict to \( D_1 = \{ x \leq 0 \} \) (the vertex and left) or to \( D_2 = \{ x \geq 0 \} \) (the vertex and right). In either case the range is \( R = \{ y \leq 4 \} \).

Since the inverse function maps the original function’s range to its domain, we should expect \( y = f^{-1}(x) \) to have domain \( \{ x \leq 4 \} \) and range either \( \{ y \leq 0 \} \) or \( \{ y \geq 0 \} \) (depending on which inverse we take).

Let’s now find the inverse: we want to solve \( y = 4 - x^2 \) for \( x \). The simplest way is the direct way: \( x^2 = 4 - y \), so \( x = +\sqrt{4 - y} \) or \( x = -\sqrt{4 - y} \). Thus our two two possible inverse functions are \( f^{-1}(y) = +\sqrt{4 - y} \) or \( f^{-1}(y) = -\sqrt{4 - y} \). Written in terms of \( x \), and including the domains and ranges, we get two possible answers: \( f^{-1}(x) = +\sqrt{4 - x} \) with domain \( \{ x \leq 4 \} \) and range \( \{ y \geq 0 \} \), or \( f^{-1}(x) = -\sqrt{4 - x} \) with domain \( \{ x \leq 4 \} \) and range \( \{ y \leq 0 \} \).

We find the zeros and asymptotes of \( h(x) = \frac{2x - 6}{x - 1} \) as follows. The zeros are where the numerator \( 2x - 6 \) is zero; this occurs at \( x = 3 \). (This is the point \( (x, y) = (3, 0) \).) The vertical asymptote is the line \( x = 1 \); we find this by solving for where the denominator of \( h(x) \) is zero. Finally, to find the horizontal asymptote is found by multiplying the top and bottom of \( h(x) \) by \( 1/x \) as follows:

\[
h(x) = \frac{2x - 6}{x - 1} \cdot \frac{1/x}{1/x} = \frac{2 - 6/x}{1 - 1/x}.
\]

As \( x \) gets large (in a positive or negative direction), \( 1/x \) and \( 6/x \) get close to zero, and so \( h(x) \) gets close to \( 2/1 = 2 \). Thus the horizontal asymptote is \( y = 2 \).
Here is the graph of the function $y = h(x)$. We have included a number of points in addition to the asymptotes:

The dots have been placed at the following points on the graph:

$(−8, 22/9)$  $(−7, 2.5)$  $(−6, 18/7)$  $(−5, 8/3)$  $(−4, 2.8)$

$(−3, 3)$  $(−2, 10/3)$  $(−1, 4)$  $(0, 6)$  $(0.2, 7)$

$(1.4, −8)$  $(1.5, −6)$  $(2, −2)$  $(3, 0)$

$(4, 2/3)$  $(5, 1)$  $(6, 1.2)$  $(7, 4/3)$  $(8, 10/7)$