AChor/MHF4U **Name: _____**
Date: _____

Worksheet 3-5: Making Connections with Rational Functions and Equations

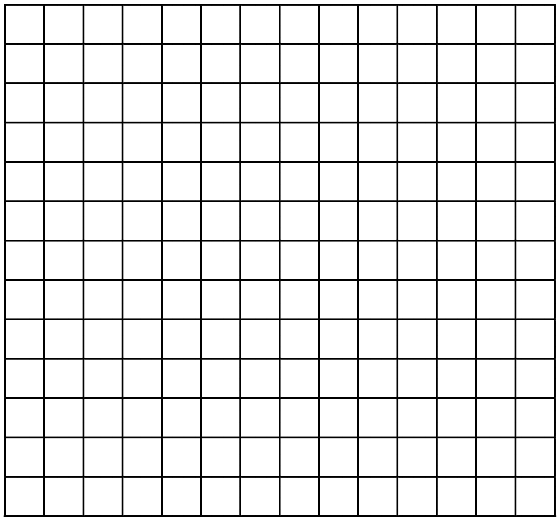
Key Concepts of Applying Rational Functions and Equations:

- When solving a problem, it is important to read carefully to determine whether a function is being analyzed or an equation or inequality is to be solved.
- A full analysis will involve four components:
  (a) numeric (tables, ordered pairs, calculations)
  (b) algebraic (formulas, solving equations)
  (c) graphical
  (d) verbal (descriptions)
- When investigating special cases of functions, factor and reduce where possible. Indicate the restrictions on the variables in order to identify hidden discontinuities.
- When investigating new types of rational functions, consider what is different about the coefficients and the degree of the polynomials in the numerator and denominator. These differences could affect the stretch factor of the curve and the equations of the asymptotes and they could cause other discontinuities.

Practice 1: Intensity of Sound

The intensity of sound, in watts per square metre, varies inversely as the square of the distance, in metres, from the source of the sound. The intensity of the sound from a loud speaker at a distance of 2 m is 0.001 W/m².

(a) Determine a function to represent this relationship.



(b) Graph this function.

(c) What is the effect of halving the distance from the source of the sound?

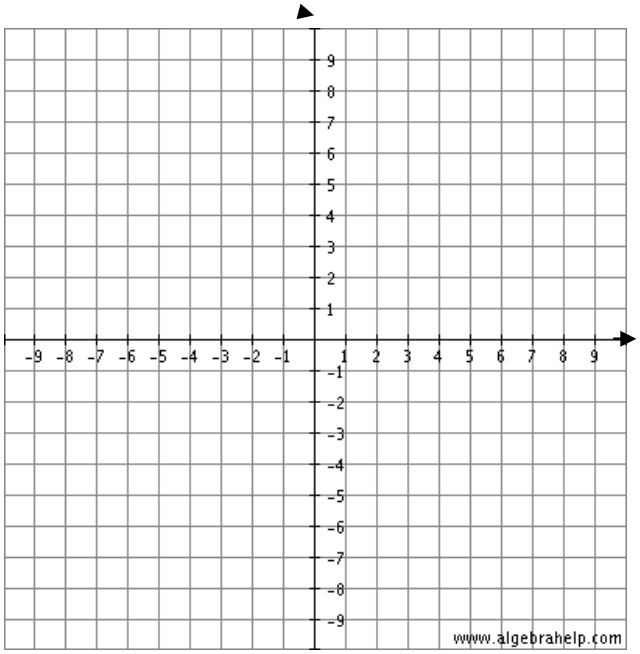
Practice 2: Driving Time

The maximum time, *T*, in minutes, a scuba diver can rise without stopping for decompression on the way up to the surface is defined by the equation $T(d) = \frac{525}{d-10}$, $d > 10$, where *d* is the depth of the dive, in metres. For the maximum time to be less than 30 min, how deep can the diver dive?

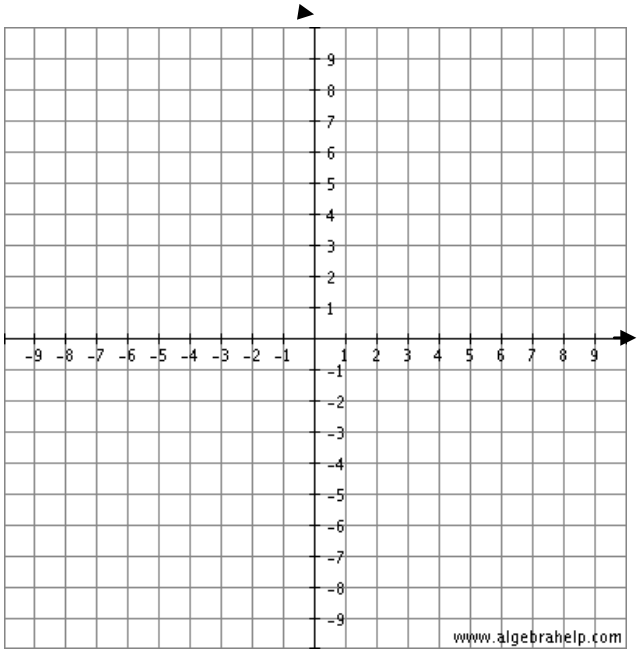
Practice 3: Special Cases

Sketch a graph of each function. Explain how these are special cases.

(a) $f(x) = \dfrac{x^2 - x - 6}{x + 2}$



(b) $g(x) = \dfrac{2x^2 - 7x - 4}{2x^2 + 5x + 2}$



(c) $h(x) = \dfrac{x^3 + 3x^2 - 4x + 2}{x^2 - 1}$