1. For each of the following,

   - use algebraic techniques to determine the Mclaurin series, giving your result in summation form
   - check your answers by graphing the first four terms of the series together with the function
   - find the radius and interval of convergence

   (a) $f(x) = \dfrac{2}{5-x}$ (b) $g(x) = \dfrac{7}{2x-3}$ (c) $h(x) = \dfrac{3}{x+2}$

2. Find the Mclaurin series for $y = \dfrac{7x}{x-3}$ by multiplying your result from 1(b) by x. Again, give your result in summation form, check by graphing, and determine the radius and interval of convergence.

3. Consider the Taylor series

$$5 + \tfrac{10}{3}(x-2) + \tfrac{20}{9}(x-2)^2 + \tfrac{40}{27}(x-2)^3 + \tfrac{80}{81}(x-2)^4 + \cdots$$

   (a) The series is geometric - what is the ratio?

   (b) Factor five out to get a series of the form $1 + r + r^2 + r^3 + \cdots$. For what values of x does the resulting series converge?

   (c) Use the formula for a convergent geometric series to find a function of the form $f(x) = \dfrac{a}{bx+c}$ that the series represents where it converges. (Don't forget to include the five!) Check by graphing.

4. In this exercise you will (hopefully!) see how to obtain a power series for $h(x) = \dfrac{2}{5-x}$ centered at $x = 3$.

   (a) Add and subtract three in the denominator.

   (b) Your goal is $1 - a(x-3)$ in the denominator. Keep whichever of 3 and -3 with the x so that you can obtain $(x-3)$ when you group. Combine the one you don't keep with x with the five.

   (c) Simplify the denominator of your result from (b) to make sure it puts you back at $h(x) = \dfrac{2}{5-x}$. If it doesn't, correct your work from (b).

   (d) Finish by using one of the techniques that you used in Exercise 1 and reversing the process of Exercise 3.

   (e) Determine the radius and interval of convergence of your series.

   (f) Graph your series and the function together to check your result.