This week on the problem set you will get practice using the ratio and root tests as well as power series. Starred questions are usually (though not always) more difficult and/or not suitable for exams however are well worth thinking about!

Homework: On Friday 2 June the following questions will be due as homework.

$$11.5.48, 11.6.51, 11.6.60$$

The questions are repeated below for convenience. Your solutions should be written up neatly and in full sentences with a clear logical flow (Top tip: read your solutions aloud, is every word you say written down? Do you have verbs, punctuation, etc?). Rough drafts, or work containing no words will not be graded.

The questions have been taken from the textbook:

J. Rogawski, C. Adams, *Calculus, Single Variable*, 3$^{\text{rd}}$ Ed., W. H. Freeman & Company,

and refer to the section and question number in the textbook.

1. (Section 11.5) 1, 3, 4, 11, 16, 23, 24, 25, 27, 37, 38, 41, 44, 47, 48, 50, 57, 59, 62, 65*.
2. (Section 11.6) 2, 11, 16, 17, 19, 23, 30, 37, 40, 44, 45, 51, 60, 61*, 65*.

Homework questions:

3. (11.5.48) Determine the convergence of $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{(2n)!}$.
4. (11.6.51) Evaluate $\displaystyle\sum_{n=1}^{\infty} \frac{n}{2^n}$. *Hint:* Use differentiation to show that

$$(1-x)^{-2} = \sum_{n=1}^{\infty} n x^{n-1} \text{ (for } |x| < 1).$$

5. (11.6.60) Let $P(x) = \displaystyle\sum_{n=0}^{\infty} a_n x^n$ be a power series solution to $y' = 2xy$ with initial condition $y(0) = 1$.
   (a) Show that the odd coefficients a_{2k+1} are zero.
   (b) Prove that $a_{2k} = a_{2k-2}/k$ and use this result to determine the coefficients a_{2k}.