Dawson College: **Integral Calculus**: 201-SN3-RE-S2: Winter 2026: **Quiz 6** name: _____

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531**. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. *(3 marks)* A sequence begins

$$6,\ 7,\ \frac{6}{2},\ \frac{7}{6},\ \frac{6}{24},\ \frac{7}{120},\ \frac{6}{720},\ldots$$

Find a formula for the general term a_n.

Question 2. *(5 marks)* Use the Squeeze Theorem to find

$$\lim_{n\to\infty} \frac{\left(\cos\left(\frac{1}{n}\right)\right)^n}{n!}.$$

Question 3. *(5 marks)* Determine whether the sequence

$$a_n = \left(\frac{1}{n}\right)^{1/\ln(\ln n)}$$

converges or diverges. If it converges, find its limit.

Question 4. *(5 marks each)* Determine whether the series

a.

$$\sum_{n=1}^{\infty} \frac{1}{\sqrt[n]{2}}$$

b.

$$\sum_{n=2}^{\infty} 2026 \left(\frac{1}{2}\right)^{n-1}$$

converges or diverges. If it converges, find its sum.

Question 5. *(5 marks)* The nth partial sum of a series $\sum_{n=1}^{\infty} a_n$ is

$$s_n = \frac{n+2}{n+3}.$$

1. Find a_1.
2. Find a formula for a_n for $n \geq 2$.
3. Identify the type of series.
4. Determine whether the series $\sum_{n=1}^{\infty} a_n$ converges or diverges.
5. If it converges, find its sum.