Dawson College: **Calculus I** (SCIENCE): 201-SN2-RE-S14: Fall 2024: **Quiz 5** 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. Evaluate:

a. *(3 marks)* $\lim_{x\to 0^+} \operatorname{arcsec}\left(1-\frac{1}{\ln x}\right)$

b. *(5 marks)* $g'(\pi/3)$ where $g(x) = x\arctan(\sin x)$ **(Simplify your answer as much as possible without using approximations.)**

c. *(5 marks)* $\lim_{x\to\infty} (e^x + x)^{1/x}$

Question 2. *(5 marks)* The sides of an equilateral triangle (a triangle with all sides equal) are increasing at the rate of 0.3 cm/s. At what rate is the area of the triangle changing when the side length is 5 cm?

Question 3. One side of a right triangle is known to be 20 cm long and the opposite angle is measured as 30°, with a possible error of $\pm 1^\circ$.

a. *(3 marks)* Use differentials to estimate the error in computing the length of the hypotenuse.

b. *(1 mark)* Explain why the error is negative when $\Delta\theta$ is positive.

c. *(1 mark)* Find an estimate of the percentage error using the differential?