Dawson College: **Integral Calculus**: 201-SN3-RE-S2: Winter 2026: **Quiz 1** 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. *(1 mark each)* Integrate the following indefinite integrals:

a.

$$\int \frac{1}{x^{1/3}}\,dx$$

b.

$$\int \sec x\,dx$$

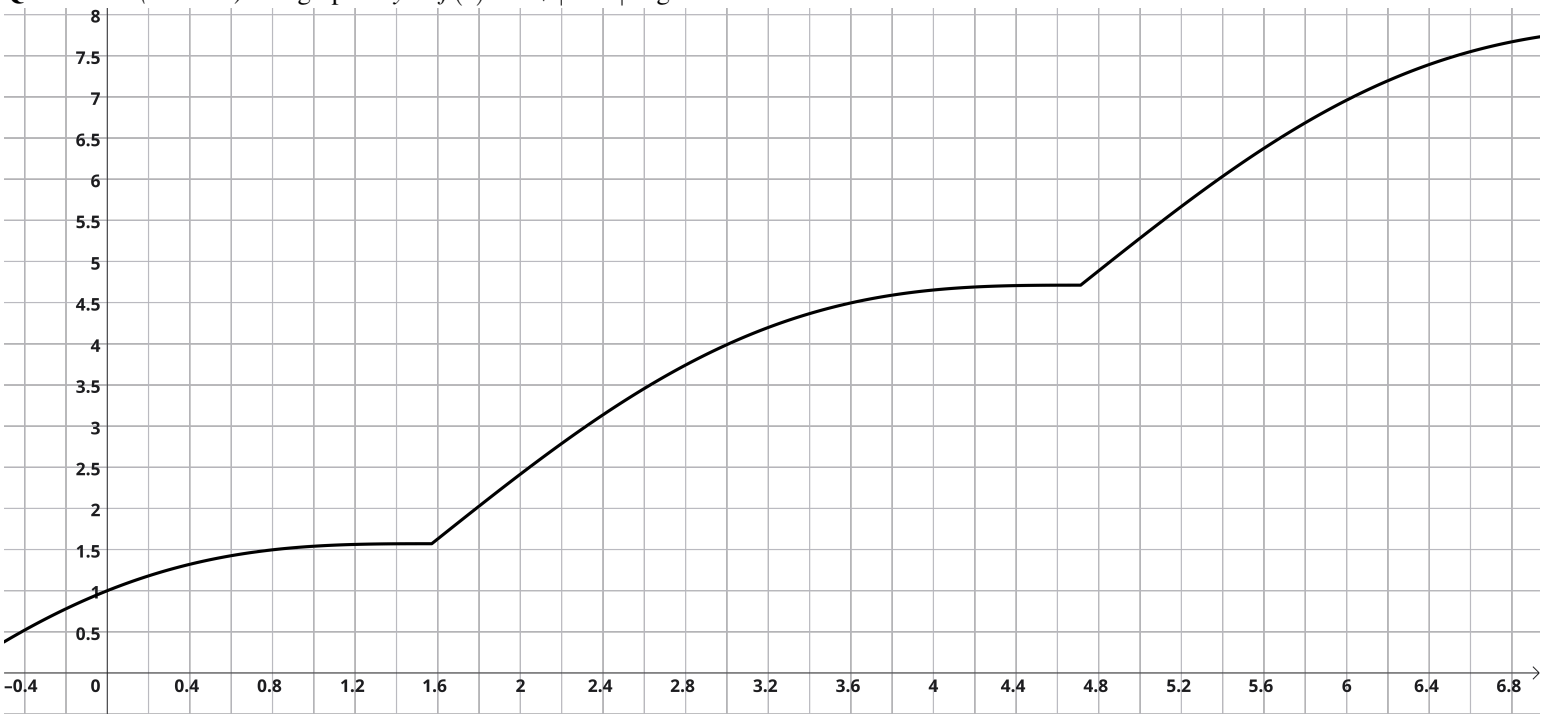
c.

$$\int \cot x\,dx$$

d.

$$\int \frac{1}{x\sqrt{5x^2-11}}\,dx$$

Question 2. *(5 marks)* The graph of $y = f(x) = x + |\cos x|$ is given below:



Find an approximation of the area under $f(x)$ on the interval $[2, 5.2]$, using the right endpoint and 4 approximating rectangles. Draw the approximating rectangles. **Use the function to find the approximation and not the graph**.

Question 3. *(3 marks)* Determine whether the function $y = f(x)$ is a solution to the initial value problem (IVP) below. Show your work.

$$f(x) = \frac{x}{2}\arctan\big(2\ln x\big) - \frac{\pi}{4}x.$$

Determine whether $f(x)$ satisfies

$$y' = \arctan(2\ln x), \qquad y\left(\sqrt{e}\right) = 0,$$

for $x > 0$.

Question 4. *(4 marks)* Sketch a region whose area is equal to $\lim\limits_{n\to\infty}\sum\limits_{i=1}^{n}\sqrt{1-\left(\frac{i}{n}\right)^2}\frac{1}{n}$ and find the exact value of the area.