Name: Y. Lamontagne
Student ID: _____

Quiz 2

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(1 mark each)* Integrate the following indefinite integrals:

a.

$$\int \frac{1}{x^{3/8}}\,dx = \int x^{-3/8}\,dx = \frac{x^{5/8}}{5/8} + C = \frac{8x^{5/8}}{5} + C$$

b.

$$\int \csc x\,dx = -\ln|\csc x + \cot x| + C$$

c.

$$\int \tan x\,dx = -\ln|\cos x| + C$$

d.

$$\int \frac{1}{x^2+6}\,dx = \int \frac{1}{x^2+(\sqrt{6})^2}\,dx = \frac{1}{\sqrt{6}}\arctan\frac{x}{\sqrt{6}} + C$$

e.

$$\int e^x\,dx = e^x + C$$

f.

$$\int \cos x\,dx = \sin x + C$$

Question 2. *(4 marks)* §4.7 #30 Find a function f such that $f'(x) = x^3$ and the line $x+y=0$ is tangent to the graph of f.

At what x value does $f(x)$ have a slope of $y = -x$ ①.

$$-1 = x^3$$
$$\sqrt[3]{-1} = x$$
$$-1 = x$$

at $x = -1$, so $y = -(-1) = 1$ ∴ $f(-1) = 1$

$$f(x) = \int f'(x)\,dx = \int x^3\,dx = \frac{x^4}{4} + C$$

$$f(-1) = 1$$
$$\frac{(-1)^4}{4} + C = 1$$
$$C = 1 - \frac{1}{4}$$
$$C = \frac{3}{4}$$

∴ $f(x) = \frac{x^4}{4} + \frac{3}{4}$