Dawson College: Calculus II - Commerce: 201-NYB-05 S13 February 16, 2012

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 4

Question 1. *(4 marks)* Find the area of the region under the function $f(x) = 1 - \sqrt[3]{x}$ on the interval $[-8, -1]$. Simplify your final answer.

$$A = \int_{-8}^{-1} (1 - x^{1/3})\,dx = \left[x - \frac{3}{4}x^{4/3}\right]_{-8}^{-1} = \left[(-1) - \frac{3}{4}(-1)^{4/3}\right] - \left[(-8) - \frac{3}{4}(-8)^{4/3}\right]$$

$$= -1 - \frac{3}{4} + 8 + 12 = \frac{73}{4}$$

Question 1. *(3+3 marks)* Evaluate the following definite integrals:

(a) $\int_1^4 \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right) dx = \int_1^4 x^{1/2} - x^{-1/2}\,dx = \left[\frac{2}{3}x^{3/2} - 2x^{1/2}\right]_1^4$

$$= \left[\frac{2}{3}(4)^{3/2} - 2(4)^{1/2}\right] - \left[\frac{2}{3}(1)^{3/2} - 2(1)^{1/2}\right]$$

$$= \frac{16}{3} - 4 - \frac{2}{3} + 2 = \frac{14}{3} - 2 = \frac{8}{3}$$

(b) $\int_1^4 \frac{3x^3 - 2x^2 + 4}{x^2}\,dx = \int_1^4 3x - 2 + 4x^{-2}\,dx$

$$= \left[\frac{3x^2}{2} - 2x - 4x^{-1}\right]_1^4 = \left[\frac{3}{2}(4)^2 - 2(4) - \frac{4}{4}\right] - \left[\frac{3}{2}(1)^2 - 2(1) - \frac{4}{1}\right]$$

$$= 24 - 8 - 1 - \frac{3}{2} + 2 + 4 = 21 - \frac{3}{2} = \frac{39}{2}$$