UNIVERSITY OF MANITOBA

MATH 1700 D01

Assignment 4

This assignment is based on units 7 and 8.

1.
Determine whether each integral is convergent or divergent. Evaluate those that are convergent.

(a) $\displaystyle\int_0^\infty \frac{x\,dx}{(1+2x^2)^{3/2}}$

(b) $\displaystyle\int_0^1 \frac{1}{(1-x)^{1/3}}\,dx$

(c) $\displaystyle\int_e^\infty \frac{dx}{x\ln x}$

2.
Find the length of the curve.

(a) $y = \dfrac{x^3}{12} + \dfrac{1}{x}$, $\qquad 1 \le x \le 4$

(b) $y^2 = (x-1)^3$, $\qquad$ from $P(1,0)$ to $Q(2,1)$

3.
Find the area of the surface obtained by rotating the curve about the x-axis.

(a) $y = \dfrac{x^3}{12} + \dfrac{1}{x}$, $\qquad 1 \le x \le 4$

(b) $4x = y^2$, $\qquad$ from $A(0,0)$ to $B(1,2)$

4.
The curve $y = x^{3/2}$ with $0 \le x \le 1$ is rotated about the y-axis. Find the area of the resulting surface.