

McGill University

Quiz 1
Version B
MATH 141

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Wednesday, May 9, 2012

2:05-3:05 pm

Time = 60 minutes

Write your exam version in the answer sheet. No calculators!
Show all your work: marks are not given for answers alone.
Enclose this question sheet in your folded answer sheet.

- (1) (10 Marks) Showing all your work evaluate the following integrals by making a substitution:

(a)

$$\int \frac{a}{(1+bx)^4} dx$$

where a and b are non-zero.

(b)

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \cos^5 x \sin x dx$$

- (2) (10 Marks) If $F(x) = \int_1^x f(t)dt$, where $f(t) = \int_1^{t^2} \frac{5+u^3}{u} du$. Find $F''(2)$.

- (3) (10 Marks) Evaluate the limit by first recognizing the sum as a Riemann sum for a function defined on $[0,1]$:

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left(\sqrt{\frac{8}{n}} + \sqrt{\frac{16}{n}} + \sqrt{\frac{24}{n}} + \cdots + \sqrt{\frac{8n}{n}} \right)$$

- (4) (20 Marks) Find the volume generated by rotating the region bounded by the given curves about the line $y = 3$, using:
(i) Washer method (ii) Cylindrical shells method.

$$y = \sqrt{x-1}, \quad y = 0, \quad x = 2$$

Good Luck