

# Mathematics 1120H – Calculus II: Integrals and Series

TRENT UNIVERSITY, Summer 2018

## Quizzes

**Quiz #1.** Wednesday, 20 June. [20 minutes]

Compute each of the following integrals.

1.  $\int \sec^2(x) \tan^2(x) dx$  [1]    2.  $\int \sec^4(x) dx$  [1.5]    3.  $\int \sin^2(x) \cos^2(x) dx$  [2.5]

**Quiz #2.** Monday, 25 June. [12 minutes]

1. Compute  $\int \frac{x^3}{\sqrt{1-x^2}} dx$ . [5]

**Quiz #3.** Wednesday, 28 June. [12 minutes]

1. Compute  $\int \frac{12}{x^3 + 4x} dx$ . [5]

**Quiz #4.** Wednesday, 4 July. [12 minutes]

Do *one* (1) of the following three questions.

1. How big does  $n$  have to be to guarantee that the Right-Hand Rule sum for  $\int_0^2 (x+1) dx$  is within  $0.1 = \frac{1}{10}$  of the exact value of the integral? [5]
2. How big does  $n$  have to be to guarantee that the Trapezoid Rule sum for  $\int_0^2 (x+1) dx$  is within  $0.1 = \frac{1}{10}$  of the exact value of the integral? [5]
3. The game of trigball is played with a double-pointed “ball” that is  $10\pi$  cm long\*. The cross-sections perpendicular to the axis of symmetry (which runs from one pointy end to the other) are circles of radius  $10 \sin(x)$  cm, where  $x$  is the distance (in cm) that cross section is from one end of the ball. Find the volume of a trigball. [5]

**Quiz #5.** Wednesday, 11 July. [10 minutes]

1. Find the arc-length of  $y = \frac{2}{3}x^{3/2}$  for  $0 \leq x \leq 3$ . [5]

**Quiz #6.** Monday, 16 July. [15 minutes]

Find the limit of each of the following sequences, if it exists. If the limit does not exist, give an informal explanation for why it doesn't.

1.  $a_n = (-1)^n$  [1]    2.  $b_n = \frac{n}{n^2 + 1}$  [1]    3.  $c_n = \arctan(n)$  [1]    4.  $d_n = \frac{n!}{2^n}$  [2]

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\* The points are sharp. Please be careful when playing with a trigball.

**Quiz #7.** Wednesday, 18 July. [20 minutes]

Determine whether each of the following series converges or not.

1.  $\sum_{n=0}^{\infty} \frac{2^{n-1}}{e^{n+1}}$  [1]    2.  $\sum_{n=2}^{\infty} \frac{1}{n^2-1}$  [1]    3.  $\sum_{n=0}^{\infty} \frac{n}{\sqrt{n^2+1}}$  [1.5]    4.  $\sum_{n=0}^{\infty} \frac{\cos(n)}{n \ln(2^n+1)}$  [1.5]

**Quiz #8.** Monday, 23 July. [20 minutes]

Determine whether each of the following series converges or not.

1.  $\sum_{n=0}^{\infty} \frac{4^n+1}{5^n+2}$  [1]    2.  $\sum_{n=1}^{\infty} \left[ \ln(e^{-1/n}) \right]^n$  [2]    3.  $\sum_{n=2}^{\infty} \left( \frac{7}{n} \right)^n$  [2]

**Quiz #9.** Wednesday, 25 July. [20 minutes]

Find the radius and interval of convergence of each of the following power series.

1.  $\sum_{n=1}^{\infty} \frac{x^n}{n^n}$  [1.5]    2.  $\sum_{n=0}^{\infty} \frac{5^{n+1}}{2^n} x^n$  [1.5]    3.  $\sum_{n=0}^{\infty} \frac{n+3}{2n+1} x^n$  [2]