

UNIVERSITY OF REGINA  
DEPARTMENT OF MATHEMATICS AND STATISTICS  
MATH 110 200730 Quiz 5 (Section 003)

Time: 20 minutes

Name: \_\_\_\_\_

Instructor: Dr. Edward Doolittle

Student #: \_\_\_\_\_

(marks) Please do questions 1 and 2. You have 10 minutes to do each question, for a total of 20 minutes for the quiz. A non-programmable calculator of the type mentioned in the course outline is allowed. If you finish early, I suggest you check your work thoroughly. **Please do not disturb your colleagues by climbing over them while they are trying to write the quiz.**

- (10) 1. At noon, ship  $A$  is 35 km west of ship  $B$ . Ship  $A$  is sailing west at 10 km/h and ship  $B$  is sailing north at 25 km/h. How fast is the distance between the ships changing at 4:00 pm that day?

- (10) 2. The **circumference** of a sphere was measured to be 84 cm with a possible error of 0.5 cm.
- (a) Use differentials to estimate the maximum error in the calculated surface area. What is the relative error?
  - (b) Use differentials to estimate the maximum error in the calculated volume. What is the relative error?

Note: in relation to the radius of a sphere, the circumference is  $C = 2\pi r$ , the surface area is  $A = 4\pi r^2$ , and the volume is  $V = (4/3)\pi r^3$ .