**MATH 1073 Calculus I**

**Assignment 7**

1. A rectangular storage container with an open top is to have a volume of 10 m3. The length of its base is twice the width. Material for the base costs $10 per square meter. Material for the sides costs $6 per square meter. Find the cost of materials for the cheapest such container.

2. A steel pipe is being carried down a hallway 9 ft wide. At the end of the hall there is a right-angled turn into a narrower hallway 6 ft wide. What is the length of the longest pipe that can be carried horizontally around the corner?



3. Find the most general antiderivative of the function.

4. A particle is moving with the given data. Find the position of the particle.

(a) *v*(*t*) = sin *t* – cos *t*, *s*(0) = 0

(b) *a* (*t*) = *t2* - 4*t* + 6, *s*(0) = 0, s(1) = 20

5. A stone is dropped from the upper observation deck (the Space Deck) of the CN Tower, 450 m above the ground.

(a) Find the distance of the stone above ground level at time t.

(b) How long does it take the stone to reach the ground?

(c) With what velocity does it strike the ground?

(d) If the stone is thrown downward with a speed of 5 m/s, how long does it take to reach the ground?

(*Hint*: If the positive direction is upward, the acceleration is negative, and it is  
*a*(*t*) = – 9.8 m2/s.)

6. Use Definition 2 to find an expression for the area under the graph of *f* as a limit. **Do not** evaluate the limit.

7. Express the limit as a definite integral on the given interval. **Do not** compute the definite integral.

8. Prove that

(*Hint*: Evaluate the corresponding limit of Riemann sums.)