

## CARNIVAL HOMEWORK

1. This homework is given to introduce you to the concept of improper integrals for double integrals and also to illustrate that the double integrals can be effective in computing important single variable integrals.

"Look at the result of Q3."

2. You should compare this concept with the known concept of improper "single variable" integral.

3. This homework contain 6 problems in total.

3. Each question is worth 2 points.

## 1. Section 12.3 Problem 30(a)

## 2. Section 12.3 Problem 30(b)

Hint: Use Q1

### 3. Section 12.3 Problem 30(c)

Hint: Use Q2

## 4. Section 12.3 Problem 30(d)

Hint: Use Q3

5. Evaluate  $\iiint_{E_a} \frac{\vec{e}^2}{(x^2+y^2+1)^2} dV$  where  $E_a$  is the solid determined by the cylinder  $x^2+y^2=a^2$  and the plane  $z=0$  and  $z=a$ .



6. Find  $\lim_{a \rightarrow \infty} \iiint_{E_a} \frac{e^{-z}}{(1+x^2+y^2)^2} dV$ . Hint: Use Q5.