# A quick note on business calculus

## “Relationship between differentiation and integration “

# Differentiation and integration are inversely related.

If differentiating function F(x) yields function f(x),then f(x) is the derivative of F(x).
If integrating function f(x) yields function F(x), then F(x) is the antiderivative of f(x).

$(x^2)'=2x \quad <====> \quad \int 2x\,dx = x^2+C$

【Example 1:circle】
To differentiate the area ==> circumference

$(\pi r^2)' = 2\pi r$

To integrate the circumference ==> area

$\int_0^r 2\pi x\,dx=\pi r^2$

【Example 2:sphere】
To differentiate the volume of sphere ==> surface area of sphere

$(\frac{4}{3}\pi r^3)'=4\pi r^2$

To integrate the surface area of sphere ==> volume of sphere

$\int_0^r 4\pi x^2\,dx=\frac{4}{3}\pi r^3$