

## Assignment 1

1. Show that  $|\vec{a} \times \vec{b}| = ab \sin \theta$ .  
(Hint:  $(\vec{a} \times \vec{b})^2 = a^2 b^2 - (\vec{a} \cdot \vec{b})^2$ )
2. Derive an expression for the volume of a cone.
3.  $\frac{d}{dx} \operatorname{Arcsec} x$
4.  $\int \operatorname{Arccos} x \, dx$
5.  $\int_0^{\infty} x^4 e^{-2x} \, dx$
6.  $\int e^{-x} \sin x \, dx$
7.  $\int \cot x \, dx$
8.  $\int x^2 \ln 3x \, dx$
9.  $\int \frac{\sec^2 t \, dt}{(2+3 \tan t)(1-2 \tan t)}$
10.  $\int_0^{\infty} \frac{r \, dr}{(4+r^2)^{3/2}}$