Introduction

- Some important properties of addition and multiplication:

COMMUTATIVE –	$a+b=b+a$ and $ab=ba$
ASSOCIATIVE –	$a+(b+c)=(a+b)+c$ and $a(bc)=(ab)c$
DISTRIBUTIVE –	$a(b+c)=ab+ac$

- $\dfrac{1}{\sin\theta}$ is **never** written $\sin^{-1}\theta$. This notation is reserved for the inverse sine.
- The argument of every function must be dimensionless – one way to argue this is that the function can be expressed as a power series!
- Rules of logarithms:
  - $\ln ab = \ln a + \ln b$ (prove by letting $a = e^{\ln a}$ and $b = b^{\ln b}$).
  - $\ln a^n = n \ln a$ (prove by letting $a^n = \left(e^{\ln a}\right)^n$).
  - $\log_a x = \dfrac{\log_b x}{\log_b a}$ (prove by letting $x = a^{\log_a x} = \left(b^{\log_b a}\right)^{\log_a x} = b^{(\log_b a)\times(\log_a x)}$, and then taking logarithms base b on both sides).
- Things like $\cos\left(\sin^{-1} x\right)$ can be avoided by using the identity.
- To simplify $\tan^{-1} x + \tan^{-1} y$ use the fact that $\tan^{-1} x + \tan^{-1} y = \dfrac{x+y}{1-xy}$ to deduce that $\tan^{-1} x + \tan^{-1} y = \tan^{-1}\left(\dfrac{x+y}{1-xy}\right)$

