

1. a. *Prove or disprove:*
  - (i)  $\tan^{-1} x = O(1)$
  - (ii)  $\frac{1}{x} = o(\frac{1}{\ln x})$
- b. *If  $f = O(g)$  and  $g = O(h)$ , is it true that  $f = O(h)$ ? Explain.*
2. *True or false? Give a reason for each answer.*
  - a.  $e^{\log_2 x} = O(x)$ .
  - b. *If  $f = o(g)$ ,  $g = o(h)$ , then  $fg = o(h^2)$ .*
3. *Evaluate the following:*
  - a.  $\sin(\tan^{-1} x)$
  - b.  $\sin(\sec^{-1}(x/6))$