

**Name:****Tutorial time:**

1. Given  $x = \arcsin(y)$ , determine an expression for  $\sin(2x)$  in terms of  $y$ . Your answer should not involve any trigonometric functions.
2. Compute the derivatives of  $f(x) = \arcsin(x^2)$  and  $g(x) = \arctan(e^x)$ .

3. Use the Mean Value Theorem to prove that  $|\sin x - \sin y| \leq |x - y|$  for all real numbers  $x$  and  $y$ .

4. Find the absolute maximum and minimum values of  $f(x) = x^4 - x^3$  on  $[-1, 2]$ .