

**GREENHILL ACADEMY**  
**S.5 HOLIDAY WORK TERM II 2024**  
**PURE MATHS PAPER 1**

**RESEARCH WORK**

Make research on the following techniques:

Chain, product and Quotient rules and use them to answer the questions;

1. Find  $\frac{d^2y}{dx^2}$  when  $y = x^2(1 - x)^2$

2. Find  $\frac{dy}{dx}$  when;

(i)  $y = \frac{x^3+x}{x+1}$

(ii)  $y = \frac{x^{3/2}}{1+x^{1/2}}$

(iii)  $y = \frac{1-\sqrt{x}}{1+\sqrt{x}}$

(iv)  $y = \frac{(x-2)(x-4)}{x-3}$

(v)  $\frac{d}{dx} \left( \frac{2x^2}{\sqrt{(x^2-1)}} \right)$

3. Find the maximum and minimum values of the expressions;

(i)  $\frac{3x}{(x-1)(x-4)}$

(ii)  $\frac{(x-1)(x-2)}{x}$