t

156)

$$y = \frac{2x^2 - 5x}{x^2 - 1}$$

---

es

$x = 0$: $y = \frac{0}{-1} = 0 \Rightarrow (0, 0)$

$y = 0$: $0 = \frac{2x^2 - 5x}{x^2 - 1}$

$2x^2 - 5x = 0$

$x(2x - 5) = 0$

$x = 0$ & $x = 5/2 \Rightarrow (0, 0)$ & $(5/2, 0)$

---

metry

$$\frac{2(-x)^2 - 5(-x)}{(-x)^2 - 1} = \frac{2x^2 + 5x}{x^2 - 1} = -\frac{(-2x^2 - 5x)}{x^2 - 1}$$

$f(-x) \neq \pm f(x) \Rightarrow$ Not odd / Even

$\Rightarrow$ No Symmetry exists

---

x / Min

ts

$u = 2x^2 - 5x \quad u' = 4x - 5$

$v = x^2 - 1 \quad v' = 2x$

$$\frac{dy}{dx} = \frac{(4x - 5)(x^2 - 1) - 2x(2x^2 - 5x)}{(x^2 - 1)^2}$$

$$= \frac{4x^3 - 4x - 5x^2 + 5 - 4x^3 + 10x^2}{(x^2 - 1)^2}$$

$$\frac{dy}{dx} = \frac{5x^2 - 4x + 5}{(x^2 - 1)^2} = 0$$ for Stat Pts to exist.

$5x^2 - 4x + 5 = 0$

$b^2 - 4ac = (-4)^2 - 4 \times 5 \times 5 = 16 - 100 < 0$

As $b^2 - 4ac < 0 \Rightarrow$ No real roots

$\Rightarrow$ No Stat Pts exist.

t
6)

$u = 5x^2 - 4x + 5 \qquad v = (x^2-1)^2$

$u' = 10x - 4 \qquad v' = 2(x^2-1)^1 \cdot 2x$

$v' = 4x(x^2-1)$

$$\frac{d^2y}{dx^2} = \frac{(10x-4)(x^2-1)^2 - 4x(x^2-1)(5x^2-4x+5)}{(x^2-1)^4}$$

$$= \frac{(10x-4)(x^2-1) - 4x(5x^2-4x+5)}{(x^2-1)^3}$$

$$= \frac{10x^3 - 10x - 4x^2 + 4 - 20x^3 + 16x^2 - 20x}{(x^2-1)^3}$$

$$\frac{d^2y}{dx^2} = \frac{-10x^3 + 12x^2 - 30x + 4}{(x^2-1)^3} = 0 \text{ for POI}$$

$$-10x^3 + 12x^2 - 30x + 4 = 0$$

$$-2(5x^3 - 6x^2 + 15x - 2) = 0$$

$2 \mid 5 \;\; -6 \;\; 15 \;\; -2$
$\quad\;\; \downarrow \;\; 10 \;\; 8$
$\quad 5 \;\; 4 \;\; 23 \;\; X$

$-2 \mid 5 \;\; -6 \;\; 15 \;\; -2$
$\quad\;\; \downarrow \;\; -10 \;\; 32$
$\quad 5 \;\; -16 \;\; X$

Doesn't factorise
$\Rightarrow$ No POI

$1 \mid 5 \;\; -6 \;\; 15 \;\; -2$
$\quad\;\; \downarrow \;\; 5 \;\; -1 \;\; 14$
$\quad 5 \;\; -1 \;\; 14 \;\; X$

$-1 \mid 5 \;\; -6 \;\; 15 \;\; -2$
$\quad\;\; \downarrow \;\; -5 \;\; 11 \;\; -26$
$\quad 5 \;\; -11 \;\; 26 \;\; X$

$\therefore$ No Stat Pts / POI

156) 2 Vertical Asymptotes (undefined)

When $x^2 - 1 = 0$

$x^2 = 1$

$x = \pm 1$

$x \to 1^+$	$y \to \infty^-$
$x \to 1^-$	$y \to \infty^+$
$x \to -1^+$	$y \to \infty^-$
$x \to -1^-$	$y \to \infty^+$

$$y = \frac{2x^2 - 5x}{(x-1)(x+1)}$$

1 Horizontal Asymptote $(x \to \pm\infty)$

$$y = \frac{2x^2 - 5x}{x^2 - 1} = \frac{2 - 5/x}{1 - 1/x^2}$$

$x \to +\infty \quad y \to 2^-$

$x \to -\infty \quad y \to 2^+$