e.g. Sketch :

$$g(x) = \frac{2x^2+5}{4-x^2}$$

Sol^n.

- Domain $= (-\infty,-2) \cup (-2,2) \cup (2,\infty)$.
- $2x^2+5 \neq 0$ anywhere. So, there is no x - intercept ;
- $g(0) = \frac{5}{4}$ Thus $(0, \frac{5}{4})$ is the y-intercept.

- Now, $4-x^2=0 \Rightarrow x = \pm 2$. and. $2x^2+5 \neq 0$. Thus,

  $x=2$ and $x=-2$ are vertical asymptotes of g. $\left[\lim_{x\to 2^-} f(x) = \infty \quad \lim_{x\to 2^+} f(x) = -\infty\right.$

- $\lim_{x\to\infty} \frac{2x^2+5}{4-x^2} = \lim_{x\to\infty} \frac{2+\frac{5}{x^2}}{\frac{4}{x^2}-1} = -2$;

  $\lim_{x\to-\infty} \frac{2x^2+5}{4-x^2} = -2$;

  ] Thus, $y=-2$ is the horizontal asymptote.

- $g'(x) = \frac{(4-x^2)4x + 2(2x^2+5)x}{(4-x^2)^2}$

$$= \frac{16x - 4x^3 + 4x^3 + 10x}{(4-x^2)^2} = \frac{26x}{(4-x^2)^2}.$$

$g'(x)=0 \Rightarrow x=0$. [2, −2 are not in domain]

Thus, $x=0$ is the critical point.

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    0

$g'(-1) < 0$

$g'(1) > 0$.