1) Find all the horizontal asymptote(s) for the following function :

$$f(x) = \frac{10x^3 - 3x^2 + 8}{\sqrt{25x^6 + x^4 + 2}}$$

2) Find all the vertical and horizontal asymptotes of the following functions :

(a) $f(x) = e^{\frac{1}{x}}$.

(b) $f(x) = \frac{|1-x^2|}{x(x+1)}$.

(c) $f(x) = \frac{\sqrt{16x^4 + 16x^2} + x^2}{2x^2 - 4}$

3) Evaluate : **(a)** $\lim_{x\to\infty} \left(\sqrt{|x|} - \sqrt{|x-1|}\right)$

(b) $\lim_{x\to-\infty} \left(\sqrt{|x|} - \sqrt{|x-1|}\right)$

4) Show that the following functions have a removable discontinuity at the given point.

(a) $f(x) = \frac{x^2 - 7x + 10}{x - 2}$ at $= 2$.

(b) $g(x) = x^3 sin\frac{1}{x^2}$ at $= 0$. (Hints : By Sandwich Thm)

5) Evaluate : $\lim_{x\to\frac{\pi}{2}} \left(\frac{\frac{1}{\sqrt{sinx}} - 1}{x - \frac{\pi}{2}} \right)$.

6) Assume the function g satisfies the inequality

$1 \le g(x) \le sin^2 x + 1$, for x near 0 .

Use the squeeze Theorem to find $\lim_{x\to 0} g(x)$.

7) Find the tangent line of the following functions at the given point.

(a) $f(x) = x^2 - 4$ at P(2, 0) ,

(b) $f(x) = \sqrt{x+3}$ at P(1,2) .

8) By the first Principle (The Definition of Derivative) to find the Derivatives of the following functions:

(a) $f(x) = x^2 + 1$

(b) $f(x) = \sqrt{3x+1}$

9) By the first Principle (The Definition of Derivative) to find $f'(2)$ of the function

$f(x) = \sqrt{x+2}$

10) Evaluate the derivatives of the following functions :

(a) $g(x) = e^{2014}$ **(b)** $f(x) = \frac{\sqrt[5]{x^{24}}}{1984}$

(c) $f(w) = w^7$ **(d)** $f(x) = 3x^5 + 5e^x$

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

(f) $h(x) = (5x^7 + 5x)(6x^3 + 3x^2 + 3)$