

1) Given the function $f(x) = 2\sin(x) + \sin |2x - 3\pi|$, $x \in [2\pi, 3\pi]$.

- a) Find the absolute maximum and absolute minimum of f .
- b) Determine the inflection points of f .

2) Find the value of the limit, if it exists: $\lim_{x \rightarrow 1} (2 - x)^{\tan\left(\frac{\pi}{2}x\right)}$.

3) Determine *all the asymptotes* of the function $y = \frac{\sqrt{x^6 + 11x^2 + 1}}{2x^3 - 1}$.

4) Show that the equation $x - 1 = 2 \cdot \sinh(x)$, $x \in \mathbb{R}$, has exactly one root.

5) Consider the function $f(x) = x^3 + x^2$ on the interval $[1, 2]$. Find the number that satisfies the conclusion of the Mean Value Theorem.