

Q1. Find the critical numbers of $f(x) = x(x-2)^{-1/3}$

Q2. Let $g''(x) = (\sin x - 1)^2(2 \cos x - 1)$, $x \in [0, \pi]$. (Note: 2nd Derivative is given)

(a) Find the intervals where the function $g(x)$ is Concave Upward or Downward.

(b). Find the points where $g(x)$ has point of inflection, if any.

(Q3 is on the other side)

Q3. Find $\lim_{x \rightarrow 0^+} (4x+1)^{\cot x}$.

(Bonus Question). Sketch the graph of the function satisfying the following conditions:

(i) Vertical Asymptote: $x = 0$.

(ii) $f'(x) > 0$ if $x < -2$. (iii) $f'(x) < 0$ if $x > -2$. ($x \neq 0$).

(iv) $f''(x) < 0$ if $x < 0$. (v) $f''(x) > 0$ if $x > 0$.

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Q1. Find the critical numbers of $f(x) = (2 \sin x - 1)^{1/3}$ in the interval $[0, \pi]$.

Q2. Let $g'(x) = (2x + 1)(3x - 5)^2$. (Note: 1st Derivative is given)

(a) Find the intervals where the function $g(x)$ is increasing or decreasing.

(b). Find the points where $g(x)$ has Local Maxima/Minima, if any.

(Q3 is on the other side)

Q3. Find $\lim_{x \rightarrow 0^+} (2-x)^{\tan(\pi x/2)}$.

(Bonus Question). Sketch the graph of the function satisfying the following conditions:

(i) Vertical Asymptote: $x = 0$.

(ii) $f'(x) > 0$ if $x < -2$. (iii) $f'(x) < 0$ if $x > -2$. ($x \neq 0$).

(iv) $f''(x) < 0$ if $x < 0$. (v) $f''(x) > 0$ if $x > 0$.