Q1 Info

Q1: Tuesday Feb 5. Covers jump discontinuities and asymptotes

Jumps

2.3 Page 102 43, 45, 49

Jump Practice

\[ a) \lim_{x \to -1} \frac{x^2 - x - 2}{1 + x} \quad b) \lim_{x \to 2} \frac{|2 - x|}{4 - x^2} \]

\[ \lim_{x \to -1} \frac{x^2 + x}{|x + 1|} \quad d) \lim_{x \to 2} \frac{|x - 2|}{x^2 + 2x - 8} \quad e) \lim_{x \to 2} \frac{x^2 - 2x}{|2 - x|} \]

Asymptotes 2.6 Page 137 3, 15, 17, 19, 23, 31, 47, 49

Q1 Practice

Asymptotes

1) For the functions \( f \) below,

\( i) \) Find all vertical asymptotes.

\( ii) \) Find a \( g(x) \) to which \( f(x) \) is asymptotic.

\( iii) \) Compute the limit to show \( f \) and \( g \) are asymptotic.

\[ a) f(x) = \frac{x^4}{x^2 - 3x + 2} \quad b) f(x) = \frac{x^4 - x^2 - 1}{x^3 + 3x} \]

2) Find any horizontal asymptotes. If there are none, find a \( g(x) \) to which \( f \) is asymptotic. Show \( f \) is asymptotic to \( g \) by computing a limit.

\[ f(x) = \frac{x^3 - x^2 - 1}{x^2 - x} \]

3) Find any horizontal asymptotes. If there are none, find a \( g(x) \) to which \( f \) is asymptotic.

\[ a) \frac{x^2 + \sqrt{x} - 6}{x^2 - 4x + 4} \quad b) \frac{x^3 - x - 1}{x^2 + 3} \quad c) \frac{x^4 + x^2 - 1}{x^2 - x - 1} \]