MAC1105 Week 12 Discussion

Module 12: Limits Answers

Find all holes, horizontal asymptotes, vertical asymptotes, and oblique asymptotes of the following functions. [Note, not all functions will have all of these.]

(1) $f(x) = \dfrac{x^3 - 4x^2 + x + 6}{x^3 + 3x^2 - 10x - 24}$

Hole: $x = 3$

Horizontal asymptote: $y = 1$

Vertical asymptote: $x = -4$, $x = -2$

Oblique asymptote: NA

(2) $f(x) = \dfrac{2x^3 + 13x^2 + 3x - 18}{x + 5}$

Hole: NA

Horizontal asymptote: NA

Vertical asymptote: $x = -5$

Oblique asymptote: $y = 2x^2 + 8x - 37$

(3) $f(x) = \dfrac{15x^2 + 29x - 14}{45x^3 + 167x^2 - 54x - 8}$

Hole: $x = \frac{2}{5}$

Horizontal asymptote: $y = 0$

Vertical asymptote: $x = -4$, $x = -\frac{1}{9}$

Oblique asymptote: NA

(4) $f(x) = \dfrac{2x^3 + x^2 - 61x + 30}{x^3 + 14x^2 + 15x - 198}$

Hole: $x = -6$

Horizontal asymptote: $y = 2$

Vertical asymptote: $x = 3$, $x = -11$

Oblique asymptote: NA

(5) $f(x) = \dfrac{3x^3 - 4x^2 - 12x + 16}{3x - 1}$

Hole: NA

Horizontal asymptote: NA

Vertical asymptote: $x = \frac{1}{3}$

Oblique asymptote: $y = x^2 - x - \frac{13}{3}$