

MATHEMATICS
Monday October 10 2016
Third Exercise Class: Solutions

Study domain, sign and axis-intercepts of the following functions

- $y = \frac{x^2+6x+5}{x^2+4x}$

Domain: $\mathbb{R}\{0\} \cup -4$

Sign: positive over $(-\infty, -5) \cup (-4, -1) \cup (0, +\infty)$; negative over $(-5, -4) \cup (-1, 0)$

Intercept: $x : \{-5\} \cup \{-1\}$; $y : \text{Impossible}$

- $y = \sqrt{\frac{x^2-x}{x^2-5x+6}}$

Domain: $(-\infty, 0] \cup [1, 2) \cup (3, +\infty)$

Sign: positive over $(-\infty, 0) \cup (1, 2) \cup (3, +\infty)$; negative *Impossible*

Intercept: $x : \{0\} \cup \{1\}$; $y : \{0\}$

- $y = x - 2 - \sqrt{x^2 - 2x - 3}$

Domain: $(-\infty, -1] \cup (3, +\infty)$

Sign: positive over $[3, \frac{7}{2})$; negative $(-\infty, -1) \cup (\frac{7}{2}, \infty)$

Intercept: $x : \{\frac{7}{2}\}$; $y : \text{Impossible}$

- $y = (x^3 - x)2^{\frac{x+1}{2x-2}}$

Domain: $\mathbb{R} \setminus \{1\}$

Sign: positive over $(-1, 0) \cup (1, +\infty)$; negative $(-\infty, -1) \cup (0, 1)$

Intercept: $x : \{-1\} \cup \{0\}$; $y : \{0\}$

- $y = \sqrt{\log_2(x^2 - 3)}$

Domain: $(-\infty, -2] \cup [2, +\infty)$

Sign: positive over $(-\infty, -2] \cup [2, +\infty)$

Intercept: $x : \{-2\} \cup \{2\}$; $y : \text{Impossible}$

- $y = x \log_2 \left(\frac{x-2}{x+2} \right)$

Domain: $(-\infty, -2) \cup [2, +\infty)$

Sign: positive over $(-\infty, -2) \cup (2, +\infty)$

Intercept: $x : \text{Impossible}$; $y : \text{Impossible}$

- $y = \log_2(4x^2 - 3x)$

Domain: $(-\infty, 0) \cup (\frac{3}{4}, +\infty)$

Sign: positive over $(-\infty, -\frac{1}{4}) \cup (1, +\infty)$; negative $(-\frac{1}{4}, 0) \cup (\frac{3}{4}, 1)$

Intercept: $x : \{1\} \cup \{-\frac{1}{4}\}$; $y : \text{Impossible}$