

5.3 Graphs of Rational Function of the Form $f(x) = \frac{ax+b}{cx+d}$

<p>A Characteristics of the Rational Function:</p> $f(x) = \frac{ax+b}{cx+d} \quad a, c \neq 0$ <p>Case 1. $cx+d$ is not a factor of $ax+b$</p> <p>Domain: $R \setminus \{-d/c\}$ Range: $R \setminus \{a/c\}$ x-intercept: $-b/a$ y-intercept: b/d if $d \neq 0$ Symmetry: neither even nor odd Vertical asymptote: $x = -d/c$ Horizontal asymptote: $y = a/c$ Continuity: There exists an infinite break at $x = -d/c$.</p>	<p>Ex 1. Find the characteristics of the function $f(x) = \frac{2x-4}{x+2}$. Then graph it.</p>
<p>B Characteristics of the Rational Function:</p> $f(x) = \frac{ax+b}{cx+d} \quad a, c \neq 0$ <p>Case 2. $cx+d$ is a factor of $ax+b$</p> <p>Domain: $R \setminus \{-d/c\}$ Range: $\{a/c\}$ x-intercept: none y-intercept: b/d if $d \neq 0$ Symmetry: neither even nor odd Vertical asymptote: none Horizontal asymptote: $y = a/c$ Continuity: There exists a hole at $x = -d/c$.</p>	<p>Ex 2. Find the characteristics of the function $f(x) = \frac{3x+6}{2x+4}$. Then graph it.</p>
<p>Ex 3. Graph the function: $f(x) = 2 - 1/x$.</p>	<p>Ex 4. Find a function of the form $f(x) = \frac{ax+b}{cx+d}$ with a horizontal asymptote $y = 2$, a vertical asymptote $x = 1$ and an x-intercept $x - int = -1$. Then graph it.</p>

Ex 5. Graph the function $f(x) = x/(x+1)$ and its reciprocal on the same grid.

Ex 6. Graph the function

$$f(x) = \frac{2x^2 + 7x + 6}{x^2 + x - 2}$$

Ex 7. Graph.

a) $f(x) = \frac{x^2}{4-x^2}$

b) $f(x) = \frac{x}{x^2 + x - 6}$

c) $f(x) = \frac{x^2 - 2x}{x+1}$

d) $f(x) = \frac{x^2 - 9}{4 - x^2}$

e) $f(x) = \frac{x^2 - 4}{x^2 + 1}$

Ex 8. Graph.

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

Reading: Nelson Textbook, Pages 263-271

Homework: Nelson Textbook, Page 272: #1, 5c, 6ad, 9, 13, 14