

## 11.1 Rational Functions Practice Problems

1. Describe the **horizontal asymptotes** of the following rational functions.

(a)  $f(x) = \frac{3x - 1}{2 - 5x}$   $y = -\frac{3}{5}$

(b)  $h(x) = \frac{x + 7}{x^2 - 6x + 8}$   $y = 0$

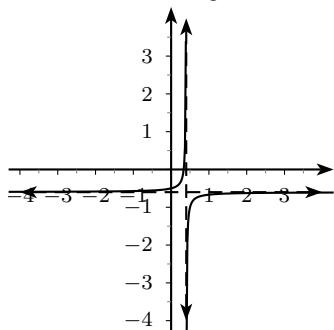
(c)  $l(x) = \frac{x^2 - 6x + 8}{x + 7}$  **No horizontal asymptote**

(d)  $n(x) = \frac{7x^2 - 3x + 2x^3 + 6}{4x - x^2 - 2 - 5x^3}$   $y = -\frac{2}{5}$

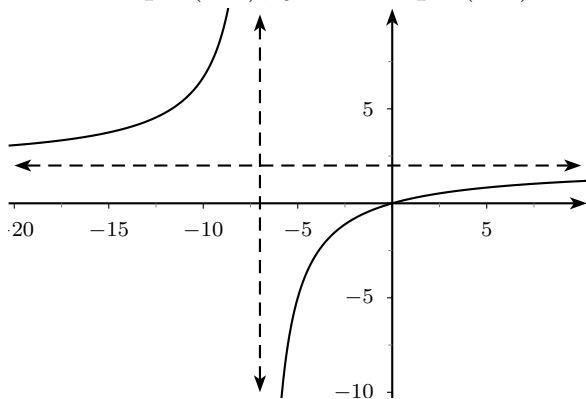
(e)  $o(x) = \frac{(2x + 5)^4(6 - x)^3}{(3x - 1)(x - 2)^6}$   $y = -\frac{2}{3}$

2. Find all vertical asymptotes, horizontal asymptotes, holes,  $x$ -intercepts, and  $y$ -intercepts for the following rational functions. Show the algebra that justifies your answer. Graph these functions.

(a)  $f(x) = \frac{3x - 1}{2 - 5x}$  **Horizontal Asymptote:**  $y = -\frac{3}{5}$ , **Vertical Asymptote:**  $x = \frac{2}{5}$ ,  
 **$x$ -intercept**  $(\frac{1}{3}, 0)$ ,  **$y$ -intercept**  $(0, -\frac{1}{2})$

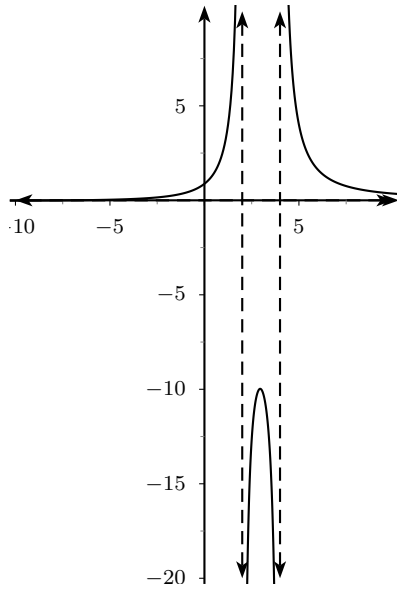


(b)  $g(x) = \frac{2x}{x + 7}$  **Horizontal Asymptote:**  $y = 2$ , **Vertical Asymptote:**  $x = -7$ ,  
 **$x$ -intercept**  $(0, 0)$ ,  **$y$ -intercept**  $(0, 0)$



(c)  $h(x) = \frac{x+7}{x^2-6x+8}$  Horizontal Asymptote:  $y = 0$ , Vertical Asymptote:

$x = 2$  and  $x = 4$ ,  $x$ -intercept  $(-7, 0)$ ,  $y$ -intercept  $(0, \frac{7}{8})$



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