

ANSWERS

1.

a.  $f(x) = \frac{2x}{x-3}$ , Domain:  $\{x \mid x \neq 3, x \in \mathbb{R}\}$ , Vertical Asymptotes:  $x = 3$ , Holes: none

b.  $f(x) = \frac{x(2x+1)}{(x-2)(x-3)}$ , Domain:  $\{x \mid x \neq 2, 3, x \in \mathbb{R}\}$ , Vertical Asymptotes:  $x = 2, x = 3$ , Holes: none

c.  $f(x) = \frac{3x(x-7)}{3(2x+1)(x-7)}$ , Domain:  $\{x \mid x \neq -\frac{1}{2}, 7, x \in \mathbb{R}\}$ , Vertical Asymptotes:  $x = -\frac{1}{2}$ , Holes:  $(7, \frac{7}{15})$

d.  $f(x) = \frac{x(x^2+1)}{x(2x+1)(3x-1)}$ , Domain:  $\{x \mid x \neq -\frac{1}{2}, 0, \frac{1}{3}, x \in \mathbb{R}\}$ , Vertical Asymptotes:  $x = -\frac{1}{2}, x = \frac{1}{3}$ ,  
Holes:  $(0, -1)$

e.  $f(x) = \frac{x(x-1)(x+1)}{(x+1)(2x+3)(x+2)}$ , Domain:  $\{x \mid x \neq -2, -\frac{3}{2}, -1, x \in \mathbb{R}\}$ , Vertical Asymptotes:  
 $x = -2, x = -\frac{3}{2}$ , Holes:  $(-1, 2)$

2. Answers may vary; one possible equation is  $y = \frac{(-x^2+4)(x+1)(x-2)}{(x+1)(x-2)}$

3. a. HA:  $y = 2$ ,  $f(x) \rightarrow 2$  from above as  $x \rightarrow \infty$ ,  $f(x) \rightarrow 2$  from below as  $x \rightarrow -\infty$

b. HA:  $y = -1$ ,  $g(x) \rightarrow -1$  from above as  $x \rightarrow \pm\infty$

c. HA:  $y = 0$ ,  $h(x) \rightarrow 0$  from above as  $x \rightarrow \infty$ ,  $h(x) \rightarrow 0$  from below as  $x \rightarrow -\infty$

4.  $a = 6, b = -2, c = 8$

5.

a. II

b. V

c. VI

d. III

e. I

f. IV

6.