

2.6 Asymptote and Hole Worksheet 1

Find all asymptotes and holes for the following functions:

1. $y = \frac{x-3}{x^2+2x-15}$

$$\frac{x-3}{(x+5)(x-3)}$$

HA: $y=0$
 SA: dne
 D: $x \neq -5, 3$
 VA: $x=-5$
 Holes: $x=3$
 x-int: dne
 y-int: $1/5$

2. $f(x) = \frac{x^2-7x+12}{x-4}$

$$\frac{(x-4)(x-3)}{(x-4)}$$

HA: dne
 SA: $y=x-3$
 D: $x \neq 4$
 VA: dne
 Holes: $x=4$
 x-int: $x=3$
 y-int: $y=-3$

3. $y = \frac{x^2+2x}{x}$

$$\frac{x(x+2)}{x}$$

HA: dne
 SA: $y=x+2$
 D: $x \neq 0$
 VA: dne
 Holes: $x=0$
 x-int: $x=-2$
 y-int: $y=dne$

4. $y = \frac{x^2}{x^2-2x}$

$$\frac{x \cdot x}{x(x-2)}$$

HA: $y=1$
 SA: dne
 D: $x \neq 0, 2$
 Holes: $x=0$
 x-int: dne
 y-int: dne
 VA: $x=2$

5. $f(x) = \frac{x^2+6x+8}{x^2-16}$

$$\frac{(x+4)(x+2)}{(x+4)(x-4)}$$

HA: $y=1$
 SA: dne
 D: $x \neq 4, -4$
 VA: $x=4$
 Holes: $x=-4$
 x-int: $x=-2$
 y-int: $y=-1/2$

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

$$\frac{(x-1)(x+1)}{(x-1)(x+1)}$$

HA: $y=1$
 SA: dne
 D: $x \neq 1, -1$
 VA: dne
 Holes: $x=1, -1$
 x-int: dne
 y-int: $y=1$

7. $y = \frac{2x^3+5x^2-3x}{x^2-x}$

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

HA: dne
 SA: $y=2x-3$
 D: $x \neq 0, 1$
 VA: $x=1$
 Holes: $x=0$
 x-int: $x=\frac{1}{2}, -3$
 y-int: $y=dne$

8. $f(x) = \frac{(2x-3)(x+5)}{x+5}$

HA: dne
 SA: $y=2x-3$
 D: $x \neq -5$
 VA: dne
 Holes: $x=-5$
 x-int: $x=\frac{3}{2}$
 y-int: $y=-3$

9. $f(x) = \frac{x^2-9}{x^2-3x}$

$$\frac{(x+3)(x-3)}{x(x-3)}$$

HA: $y=1$
 SA: dne
 D: $x \neq 0, 3$
 VA: $x=0$
 Holes: $x=3$
 x-int: $x=-3$
 y-int: dne

10. $y = \frac{2x^3+14x^2+20x}{(x+5)(x+2)}$

$$\frac{2x(x+5)(x+2)}{(x+5)(x+2)}$$

HA: dne
 SA: $y=2x$
 D: $x \neq -5, -2$
 VA: dne
 Holes: $x=-5, -2$
 x-int: $x=0$
 y-int: 0