Worksheet A: (Topics 1.9 – 1.10) Vertical Asymptotes and Holes Name:

Directions: For each of the following rational functions, determine and label any values of x where the graph has a hole or vertical asymptote.

1. $f(x)=\dfrac{(x-1)(x-5)}{(x-5)(x+2)}$

2. $g(x)=\dfrac{(x+3)(x-1)}{(x-3)(x+1)}$

3. $h(x)=\dfrac{(x+4)(x-6)}{(x-6)(x-6)}$

4. $k(x)=\dfrac{(x-8)(x+2)^2}{x(x-1)(x+2)}$

5. $r(x)=\dfrac{x^2+x-6}{x^3-4x}$

6. $p(x)=\dfrac{x^2-1}{x^2+1}$

Directions: For each of the following, write the left and right limit statements for $f(x)$ as x approaches 3.

7. $f(x)=\dfrac{(x+2)(x-6)}{x-3}$

Left:

Right:

8. $f(x)=\dfrac{(x-3)(x+3)}{x(x-3)}$

Left:

Right:

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

Left:

Right:

Directions: Write an equation of a rational function that has the following properties.

10. The graph of f has a hole at $x=3$ and vertical asymptotes at $x=1$ and $x=-4$.

11. The graph of g has a hole at $x=-1$, a vertical asymptote at $x=7$, and a zero at $x=-2$.

12. The graph of h has a hole at $x=2$ and $x=5$, a vertical asymptote at $x=0$, and a zero at $x=1$.