Rational Worksheet Day 4 **Homework**

I. List all the horizontal, vertical and slant asymptotes, holes, and state the domain.

1. $f(x) = \dfrac{2x}{x+4}$

Hole: N/A
Domain: $(-\infty,-4)\cup(-4,\infty)$
VA: $x=-4$
HA: $y=2$
SA: N/A
x-intercept: $(0,0)$
y-intercept: $(0,0)$

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

Hole: N/A
Domain: $(-\infty,\frac{1}{2})\cup(\frac{1}{2},5)\cup(5,\infty)$
VA: $x=\frac{1}{2}$ $x=5$
HA: $y=0$
SA: N/A
x-intercept: $(1,0)$
y-intercept: $(0,-\frac{1}{5})$

3. $g(x) = \dfrac{x-2}{x^2+4x+3}$ $x-2$ / $x+3$ $x+1$

Hole: N/A
Domain: $(-\infty,-3)\cup(-3,-1)\cup(-1,\infty)$
VA: $x=-3$ $x=-1$
HA: $y=0$
SA: N/A
x-intercept: $(2,0)$
y-intercept: $(0,-\frac{2}{3})$

4. $f(x) = \dfrac{x^2}{x^2+1}$

Hole: N/A
Domain: $(-\infty,\infty)$
VA: N/A
HA: $y=0$
SA: N/A
x-intercept: $(0,0)$
y-intercept: $(0,0)$

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

Hole: $(-1,0)$
Domain: $(-\infty,-1)\cup(-1,1)\cup(1,\infty)$
VA: $x=1$
HA: $y=1$
SA: N/A
x-intercept: $(-1,0)$
y-intercept: $(0,-1)$

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

-4 | 1 3 −3
−4 4
1 −1 1

Hole: N/A
Domain: $(-\infty,-4)\cup(-4,\infty)$
VA: $x=-4$
HA: N/A
SA: $y=x-1$
x-intercept: $\left(\frac{-3\pm\sqrt{21}}{2},0\right)$
y-intercept: $(0,-\frac{3}{4})$

7. $g(x) = \dfrac{x^2+3x-4}{x}$ $x+4$ $x-1$

Hole: N/A
Domain: $(-\infty,0)\cup(0,\infty)$
VA: $x=0$
HA: N/A
SA: $y=x+3$
x-intercept: $(-4,0)(1,0)$
y-intercept: N/A

8. $f(x) = \dfrac{2x}{2x-8}$

Hole: N/A
Domain: $(-\infty,4)\cup(4,\infty)$
VA: $x=4$
HA: $y=1$
SA: N/A
x-intercept: $(0,0)$
y-intercept: $(0,0)$

9. $h(x) = \dfrac{x^2-9}{x-3}$ $x+3$ $x-3$ / $x-3$

Hole: $(3,6)$
Domain: $(-\infty,3)\cup(3,\infty)$
VA: N/A
HA: N/A
SA: N/A
x-intercept: $(-3,0)$
y-intercept: $(0,3)$

10. $f(x) = \dfrac{2}{x-4}$

Hole: N/A
Domain: $(-\infty,4)\cup(4,\infty)$
VA: $x=4$
HA: $y=0$
SA: N/A
x-intercept: N/A
y-intercept: $(0,-\frac{1}{2})$

11. $g(x) = \dfrac{x^2-6x+9}{x^2-x-6}$ $x-3$ $x-3$ / $x-3$ $x+2$

Hole: $(3,0)$
Domain: $(-\infty,-2)\cup(-2,3)\cup(3,\infty)$
VA: $x=-2$
HA: $y=1$
SA: N/A
x-intercept: $(3,0)$
y-intercept: $(0,-\frac{3}{2})$

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

Hole: $(2,0)$ $(-1,0)$
Domain: $(-\infty,-1)\cup(-1,2)\cup(2,\infty)$
VA: N/A
HA: N/A
SA: N/A
x-intercept: $(2,0)$ $(-1,0)$
y-intercept: $(0,-2)$