Graphing Rational Functions
Sketch each of the following graphs. State the domain and range.

$$
\begin{aligned}
& y=\frac{x^{2}-5 x+4}{1-x} \\
& y=\frac{(x-1)(x-4)}{-(x-1)} \\
& y=-x+4 x \neq 1 \\
& \text { Pod. }(1,3) \\
& \text { No VA } \\
& \text { No HA } \\
& \text { D: }\{x \mid x \in \mathbb{R}, x \neq 1\} \\
& \text { OR: }\{y \mid y \in \mathbb{R}, y \neq 3\} \\
& D: \quad(-\infty, 1) \cup(1, \infty) \\
& R: \quad(-\infty, 3) \cup(3, \infty)
\end{aligned}
$$

$$
\begin{aligned}
& y=\frac{4 x-12}{x^{2}-7 x+12} \\
& =\frac{4(x-3)}{(x-5)(x-4)} \\
& =\frac{4}{x-4, x \neq 3,4} \\
& \begin{array}{l}
\text { P.o.d. }(3,-4) \\
V A \quad x=4 \\
H A \quad y=0 \\
D:(-\infty, 3) \cup(3,4) \cup(4, \infty) \\
R:(-\infty,-4) \cup(-4,0) \cup(0, \infty)
\end{array}
\end{aligned}
$$

$$
R:(-\infty,-4) \cup(-4,0) \cup(0, \infty)
$$

$$
\begin{aligned}
& y=\frac{3 x^{2}}{x^{2}-4} \\
& =\frac{3 x^{2}}{(x-2)(x+2)} \begin{array}{l}
x \neq \pm 2 \\
\text { VA } x= \pm 2 \\
\text { HA } y=3 \\
y=\frac{3(-3)^{2}}{(-3)^{2}-4} \\
=\frac{27}{5}
\end{array} . \begin{array}{l}
\end{array}{ }^{2}
\end{aligned}
$$



$$
\begin{aligned}
& y=\frac{3}{x^{2}+1} \\
& \text { No NPVS } \\
& \text { HA } y=0 \\
& \text { D: }\{x \mid x \in \mathbb{R}\} \\
& \text { R: }\{y \mid 0<y \leq 3\}
\end{aligned}
$$



