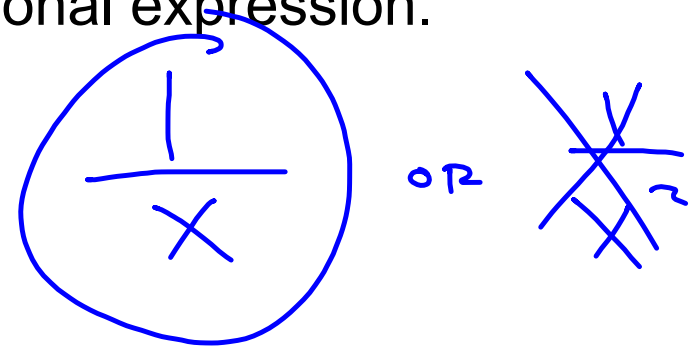
5-2 Graphing Transformation Form

I can graph the transformation form of a rational expression.



When given a rational function in the form of $f(x)=\frac{mx+n}{px+q}$ where $m \neq 0$ and $p \neq 0$, you can use division to re-write the function in a form to identify the transformations.

$$g(x)=\frac{3x-4}{x-1}$$

$x-1 \overline{)3x-4}$

$1 \;|\; 3 \quad -4$

$\downarrow \quad 3$

$3 \quad |-1|$

$3+\frac{-1}{x-1}$

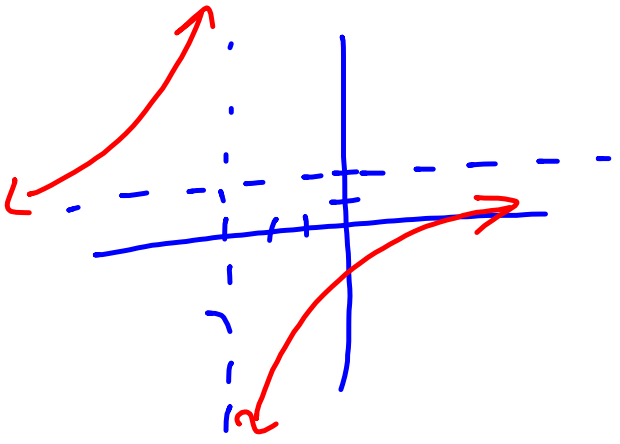
$\frac{-1}{x-1}+3$

- up 3
- flip
- Right 1

Given $f(x)=\dfrac{2x-1}{x+3}$, use division to re-write the function and identify the transformations.

$$\begin{array}{r|rr} -3 & 2 & -1 \\ & & -6 \\ \hline & 2 & -7 \end{array}$$

$$2+\frac{-7}{x+3}$$

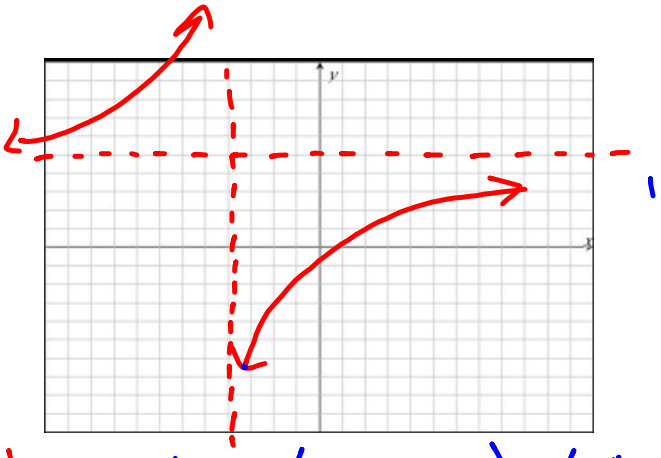


- left 3
- up 2
- flip

Given $f(x)=\dfrac{4x+7}{x+4}$, use division to re-write the function and identify the transformations. Then sketch a graph and state the domain, range, and intervals of increasing and decreasing.

$$\begin{array}{r|rr} -4 & 4 & 7 \\ & \downarrow & -16 \\ \hline & 4 & -9 \end{array}$$

$4+\dfrac{-9}{x+4}$



- flip
- up 4
- left 4

D: $(-\infty,-4)\cup(-4,\infty)$

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

I: $(-\infty,-4)\cup(-4,\infty)$

De: DNE

Given $f(x)=\dfrac{3x+7}{x+2}$, use division to re-write the function and identify the transformations. Then sketch a graph and analyze.

Domain: $(-\infty,-2)\cup(-2,\infty)$

Range: $(-\infty,3)\cup(3,\infty)$

V Asymptote: $x=-2$

H Asymptote: $y=3$

End Behavior:

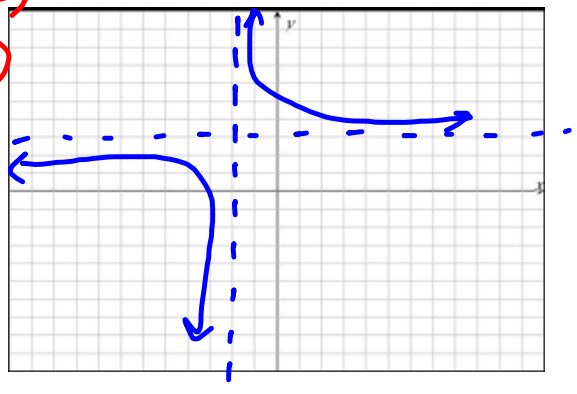
$x\to\infty,\ y\to 3$

$x\to-\infty,\ y\to 3$

V. Asymptote behavior:

$x\to -2^{+}\quad y\to\infty$

$x\to -2^{-}\quad y\to-\infty$



$$\begin{array}{r|rr} -2 & 3 & 7 \\ & \downarrow & -6 \\ \hline & 3 & 1 \end{array}$$

$3+\dfrac{1}{x+2}$

· Left 2

· Up 3

$$f(x)=\frac{5-2x}{x+4}$$

Domain: $(-\infty,-4)\cup(-4,\infty)$

Range: $(-\infty,-2)\cup(-2,\infty)$

V Asymptote: $x=-4$

H Asymptote: $y=-2$

End Behavior:

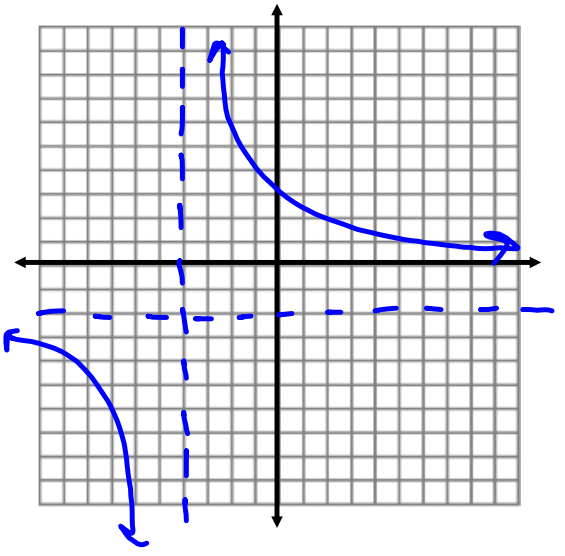
$x\to\infty \quad y\to$

$x\to-\infty \quad y\to$

Asymptote behavior:

$x\to-4^{+} \quad y\to$

$x\to-4^{-} \quad y\to$



$$\begin{array}{r|rr} -4 & -2 & 5 \\ & \downarrow & 8 \\ \hline & -2 & 13 \end{array}$$

$$-2+\frac{13}{x+4}$$

left 4

down 2

$$\frac{13}{x+4}-2$$

$$f(x)=\frac{4-3x}{x-5}$$

Domain:

Range:

V Asymptote:

H Asymptote:

End Behavior:

Asymptote behavior: