7-2 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.

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

$(3x-4) \div (x-1)$

$+1 \mid 3 \quad -4$

$\downarrow \quad 3$

$3 \mid -1$

R

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

Transformations:

- Shift → 1
  ↑ 3
- V. Flip

$(x^2+5x-7) \div (x+2) = (x+3) + \frac{-13}{x+2}$

-2 | 1 5 −7

+ ↓ −2 −6

1x + 3 | −13 Remainder

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

-3 | 2 −1

+ ↓ −6

2 | −7

$f(x) = \frac{-7}{x+3} + 2$

$-7 \cdot 1$

Transformations

- Shift Left 3 Up 2
- V. Flip
- V. Stretch by 7

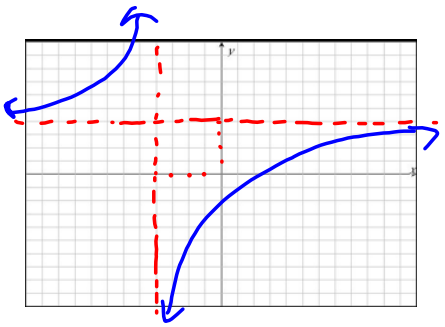
Given $f(x)=\frac{4x+7}{x+4}$, use division to re-write the function and identify the transformations. Then sketch a graph and state the domain, range, and intervals of increasing and decreasing.

$-4\,|\,4\quad 7$

$+\downarrow\quad -16$

$4\quad |\,-9$

$f(x)=\frac{-9}{(x+4)}+4$



Transformations:

- Shift Left 4
- Shift Up 4

V. Stretch by -9 { · V. Flip · V. Stretch by 9

Given $f(x)=\frac{3x+7}{x+2}$, 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:

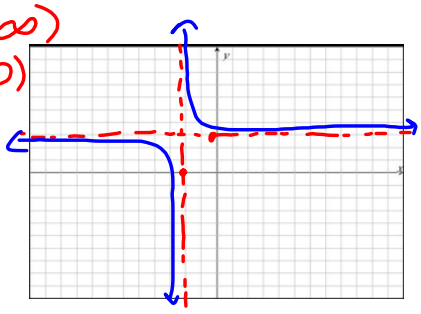
$\lim_{x\to-\infty} f(x)=3$

$\lim_{x\to\infty} f(x)=3$

Asymptote behavior:

$\lim_{x\to-2^-} f(x)=-\infty$

$\lim_{x\to-2^+} f(x)=+\infty$



Transformations:

Shift Left 2

Up 3

$-2\,|\,3\quad 7$

$\downarrow\quad -6$

$3\quad |\,1$

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

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

Domain:

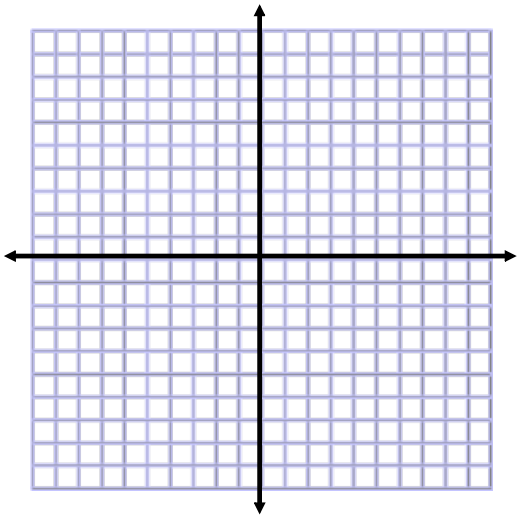
Range:

V Asymptote:

H Asymptote:

End Behavior:

Asymptote behavior:



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

Domain:

Range:

V Asymptote:

H Asymptote:

End Behavior:

Asymptote behavior: