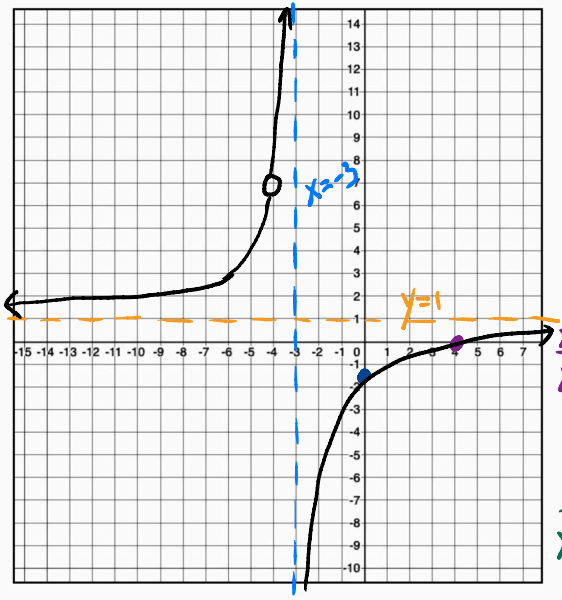
MORE Graphing Rational Functions Part 2 - Non-Transformational



$$f(x)=\frac{x^2-16}{x^2+7x+12} \rightarrow \frac{(x+4)(x-4)}{(x+4)(x+3)}$$

x-intercepts:	(4, 0)
Vertical Asymptotes:	$x=-3$
Horizontal Asymptotes:	$y=1$
Holes:	@ $x=-4$
y-Intercept(s):	$(0,-4/3)$
Domain:	$(-\infty,-4)\cup(-4,-3)\cup(-3,\infty)$
Range	

x-int

$x-4=0$

$x=4$

vertical asymptote

$x+3=0$

$x=-3$

horizontal asymptote

$y=1$

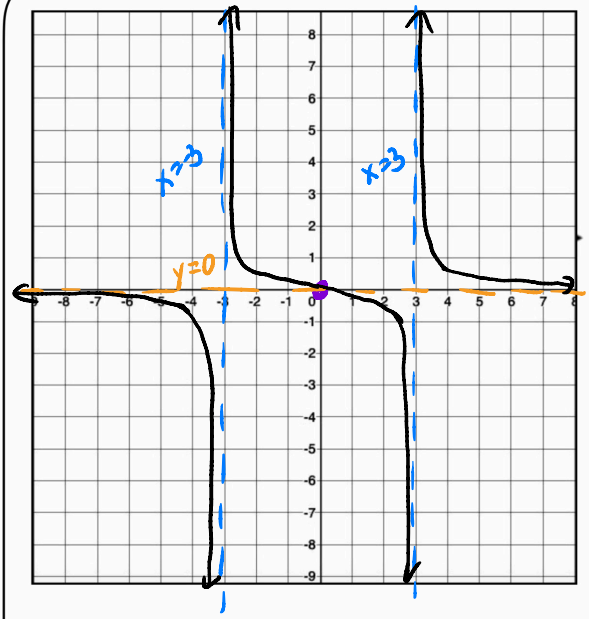
holes

$x+4=0$

$x=-4$

y-intercept

$$f(0)=\frac{(0)^2-16}{(0)^2+7(0)+12}=\frac{-4}{3}$$



$$f(x)=\frac{x}{x^2-9} \rightarrow \frac{x}{(x-3)(x+3)}$$

x-intercepts:	(0,0)
Vertical Asymptotes:	$x=3$ $x=-3$
Horizontal Asymptotes:	$y=0$
Holes:	none
y-Intercept(s):	(0,0)
Domain:	$(-\infty,-3)\cup(-3,3)\cup(3,\infty)$
Range	

x-int

$x=0$

vertical asymptote

$(x-3)(x+3)=0$

$x-3=0 \quad x+3=0$

$x=3 \quad x=-3$

horizontal asymptote

$y=0$

x-int

$f(0)=\frac{0}{0^2-9}=0$

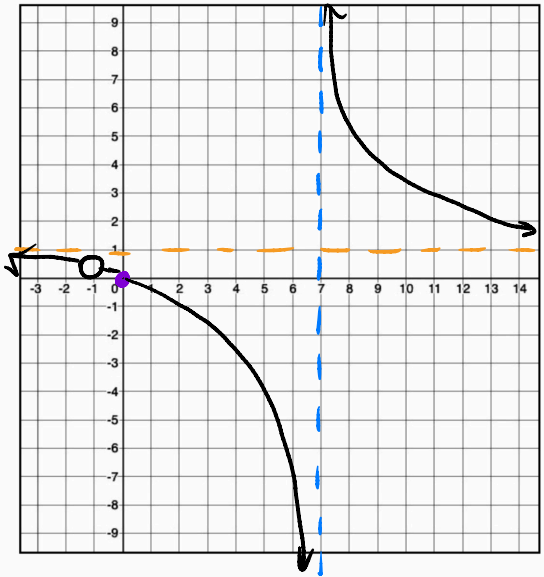
Strategic points

$f(-4)=-4/7$

$f(-1)=1/8$

$f(1)=-1/8$

$f(4)=4/7$



$$f(x)=\frac{x^2+x}{x^2-6x-7} \rightarrow \frac{x(x+1)}{(x-7)(x+1)}$$

x-intercepts:	(0,0)
Vertical Asymptotes:	$x=7$
Horizontal Asymptotes:	$y=1$
Holes:	@ $x=-1$
y-Intercept(s):	(0,0)
Domain:	
Range	

x-int

$x=0$

vertical asymptote

$x-7=0$

$x=7$

horizontal asymptote

$y=1$

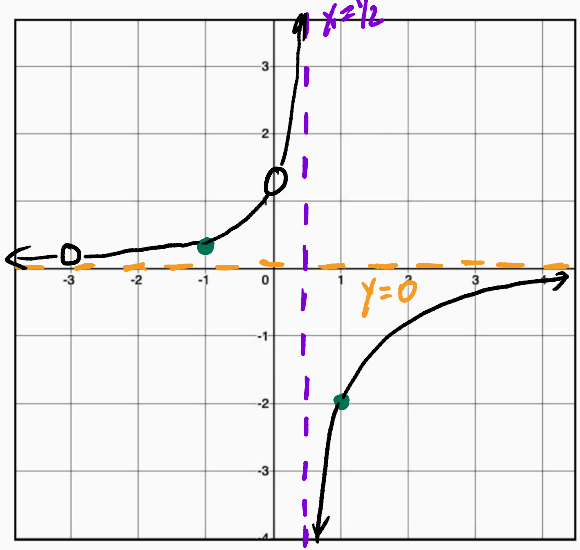
holes

$x+1=0$

$x=-1$

y-int

$f(0)=\frac{(0)^2+(0)}{(0)^2-6(0)-7}=0$



Strategic points

$f(-1) = \frac{2}{5}$ $f(1) = -2$

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

$\frac{-2(4)}{(1)(1)(4)}$

x-intercepts:	none
Vertical Asymptotes:	$x = \frac{1}{2}$
Horizontal Asymptotes:	$y = 0$
Holes:	@ $x = 0$ and $x = -3$
y-Intercept(s):	none
Domain:	
Range	

x-int: $-2 \neq 0$

vertical asymptote: $2x - 1 = 0$, $x = \frac{1}{2}$

horizontal asymptote: $y = 0$

holes: $x = 0$, $x + 3 = 0$, $x = -3$

y-int: $f(0)$ = is a hole so no y-int.