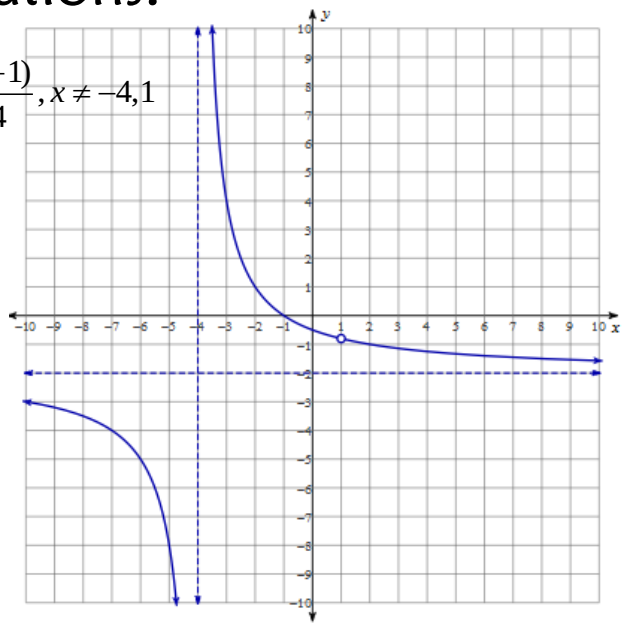
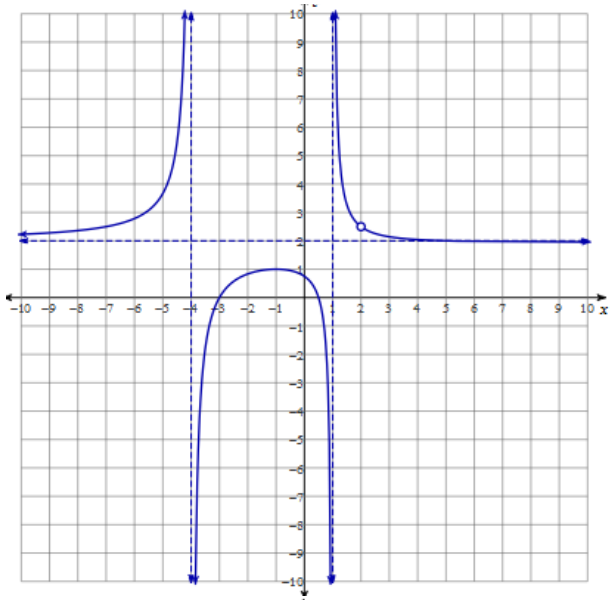
Graphing Rational Functions - Solutions:

a. $f(x)=\dfrac{-2x^2+2}{x^2+3x-4}=\dfrac{-2(x^2-1)}{(x+4)(x-1)}=\dfrac{-2(x+1)(x-1)}{(x+4)(x-1)}=\dfrac{-2(x+1)}{x+4}, x\neq -4,1$



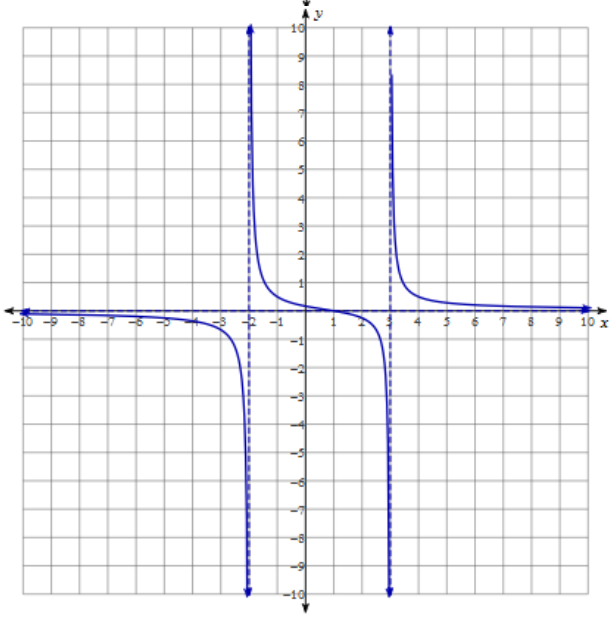
y-intercept	$\left(0,-\frac{1}{2}\right)$
x-intercept(s)	$(-1,0)$
Vertical Asymptote(s)	$x=-4$
Point(s) of Discontinuity	$\left(1,-\frac{4}{5}\right)$
Horizontal Asymptote	$y=-2$
Oblique Asymptote	none

b. $f(x)=\dfrac{(2x-1)(x+3)(x-2)}{(x+4)(x-2)(x-1)}=\dfrac{(2x-1)(x+3)}{(x+4)(x-1)}, x\neq -4,1,2$



y-intercept	$\left(0,\frac{3}{4}\right)$
x-intercept(s)	$(-3,0),\ \left(\frac{1}{2},0\right)$
Vertical Asymptote(s)	$x=-4,\ x=1$
Point(s) of Discontinuity	$(2,2.5)$
Horizontal Asymptote	$y=2$
Oblique Asymptote	none

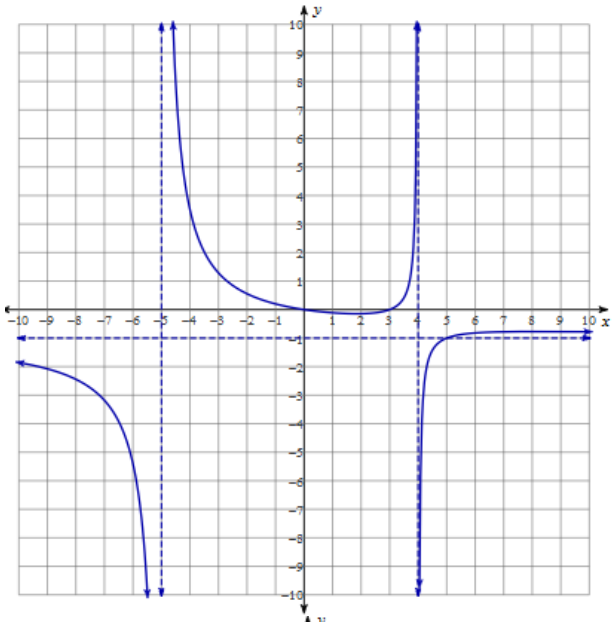
c. $f(x)=\dfrac{x-1}{x^2-x-6}=\dfrac{x-1}{(x+2)(x-3)}, x\neq -2,3$



y-intercept	$\left(0,\frac{1}{6}\right)$
x-intercept(s)	$(1,0)$
Vertical Asymptote(s)	$x=-2,\ x=3$
Point(s) of Discontinuity	none
Horizontal Asymptote	$y=0$
Oblique Asymptote	none

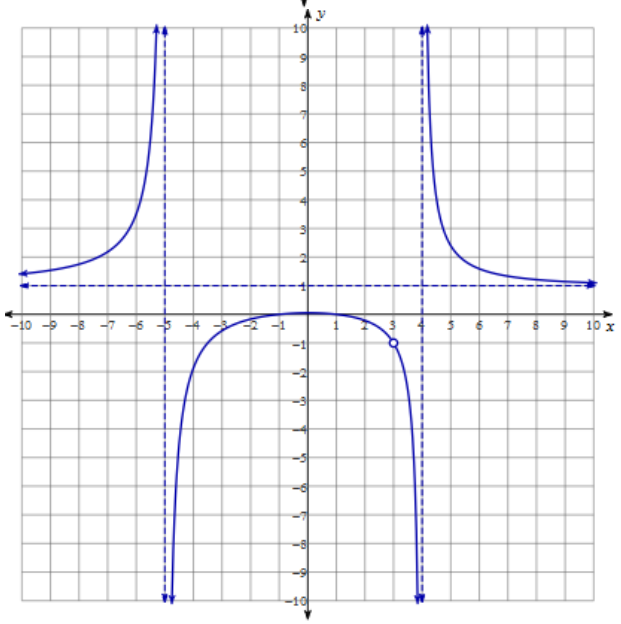
d. $f(x)=\dfrac{-x^2+3x}{x^2+x-20}=\dfrac{-x(x-3)}{(x+5)(x-4)}, x\neq -5,4$

y-intercept	$(0,0)$
x-intercept(s)	$(0,0),\ (3,0)$
Vertical Asymptote(s)	$x=-5,\ x=4$
Point(s) of Discontinuity	none
Horizontal Asymptote	$y=-1$
Oblique Asymptote	none



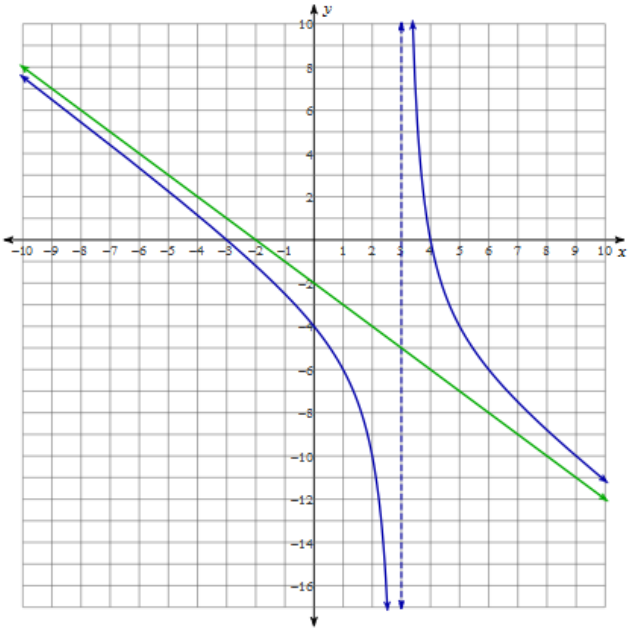
e. $f(x)=\dfrac{(x-1)(x+1)(x-3)}{(x-3)(x-4)(x+5)}=\dfrac{(x-1)(x+1)}{(x-4)(x+5)}, x\neq -5,3,4$

y-intercept	$\left(0,\frac{1}{20}\right)$
x-intercept(s)	$(-1,0),\ (1,0)$
Vertical Asymptote(s)	$x=-5,\ x=4$
Point(s) of Discontinuity	$(3,-1)$
Horizontal Asymptote	$y=1$
Oblique Asymptote	none



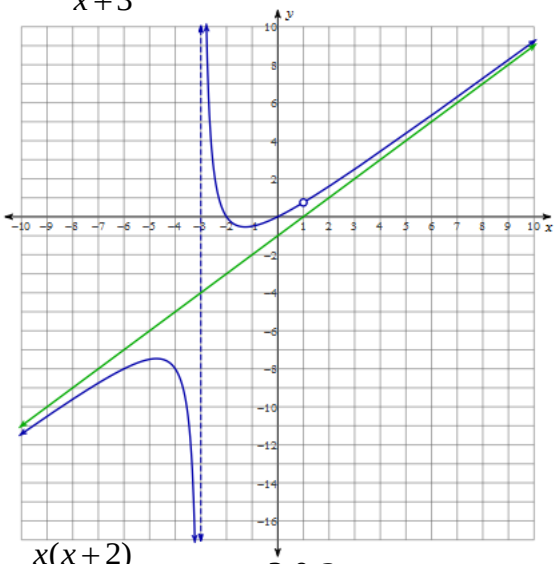
f. $f(x)=\dfrac{-x^2+x+12}{x-3}=\dfrac{-(x^2-x-12)}{x-3}=\dfrac{-(x-4)(x+3)}{x-3}=-x-2+\dfrac{6}{x-3}, x\neq 3$

y-intercept	$(0,-4)$
x-intercept(s)	$(-3,0),\ (4,0)$
Vertical Asymptote(s)	$x=3$
Point(s) of Discontinuity	none
Horizontal Asymptote	none
Oblique Asymptote	$y=-x-2$



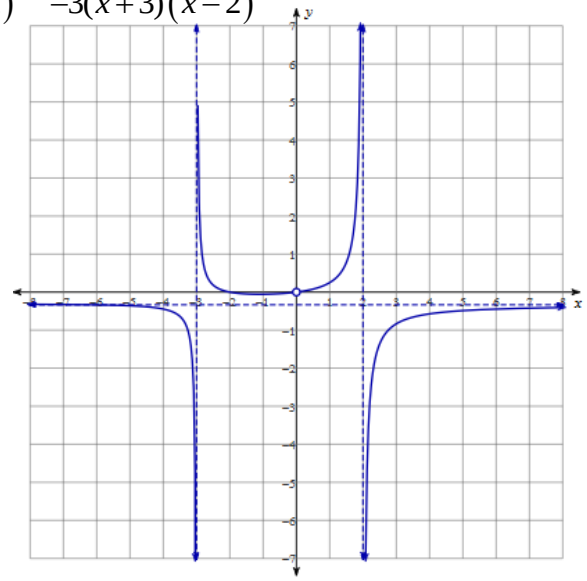
g. $f(x)=\dfrac{x^3+x^2-2x}{x^2+2x-3}=\dfrac{x(x^2+x-2)}{(x+3)(x-1)}=\dfrac{x(x+2)(x-1)}{(x+3)(x-1)}=\dfrac{x(x+2)}{(x+3)}=x-1+\dfrac{3}{x+3}, x\neq -3,1$

y-intercept	$(0,0)$
x-intercept(s)	$(-2,0),\ (0,0)$
Vertical Asymptote(s)	$x=-3$
Point(s) of Discontinuity	$\left(1,\dfrac{3}{4}\right)$
Horizontal Asymptote	none
Oblique Asymptote	$y=x-1$



h. $f(x)=\dfrac{x^3+2x^2}{-3x^3-3x^2+18x}=\dfrac{x^2(x+2)}{-3x(x^2+x-6)}=\dfrac{x^2(x+2)}{-3x(x+3)(x-2)}=\dfrac{x(x+2)}{-3(x+3)(x-2)}, x\neq -3,0,2$

y-intercept	none
x-intercept(s)	$(-2,0)$
Vertical Asymptote(s)	$x=-3,\ x=2$
Point(s) of Discontinuity	$(0,0)$
Horizontal Asymptote	$y=-\dfrac{1}{3}$
Oblique Asymptote	none



i. $f(x)=\dfrac{x^3-2x^2-8x}{3x^2-3x-6}=\dfrac{x(x^2-2x-8)}{3(x^2-x-2)}=\dfrac{x(x-4)(x+2)}{3(x+1)(x-2)}=\dfrac{1}{3}x-\dfrac{1}{3}+\dfrac{-7x-2}{3x^2-3x-6}, x\neq -1,2$

y-intercept	$(0,0)$
x-intercept(s)	$(-2,0),\ (0,0),\ (4,0)$
Vertical Asymptote(s)	$x=-1,\ x=2$
Point(s) of Discontinuity	none
Horizontal Asymptote	none
Oblique Asymptote	$y=\dfrac{1}{3}x-\dfrac{1}{3}$