Determine if each function is continuous. If the function is not continuous, find the x-axis location of each discontinuity and classify each discontinuity as infinite or removable. Also find any horizontal asymptotes.

V.A. Hole

A) $f(x)=\frac{3x^2+15x}{x+5}$ $\frac{3x(x+5)}{x+5}$

P.O.D
$x+5=0$
$x=-5$
Hole

H.A.
None

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

P.O.D
$x+2=0$
$x=-2$
V.A.

H.A.
None

C) $f(x)=\frac{9x+6}{x^2-4}$ $=\frac{3(3x+2)}{(x+2)(x-2)}$

P.O.D
$x^2-4=0$
$(x-2)(x+2)=0$
$x=2,-2$
V.A. V.A.

H.A.
$y=0$

D) $f(x)=\frac{9x+18}{x^2-4}$ $\frac{9(x+2)}{(x+2)(x-2)}$

P.O.D.
$x^2-4=0$
$(x+2)(x-2)=0$
$x=-2$ $x=2$
Hole V.A.

H.A.
$y=0$

E) $f(x)=\frac{x-5}{x^2-4x-5}$ $=\frac{x-5}{(x-5)(x+1)}$

P.O.D
$x=5$ $x=-1$
Hole. V.A.

H.A.
$y=0$

If the degree on top Is greater by 1, then The graph will have a slant asymptote.

Find the slant asymptote

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

$$f(x) = \frac{x^2 - 6x - 1}{x + 3}$$

$1 \mid 3 \quad -2 \quad 1$

$\quad\quad\quad 3 \quad 1$

$3 \quad 1 \quad \boxed{2}$

$y = 3x + 1$

$-3 \mid 1 \quad -6 \quad -1$

$\quad\quad\quad -3 \quad 27$

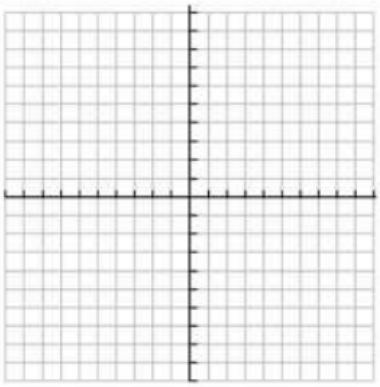
$1 \quad -9 \quad \boxed{26}$

S.A.

$y = x - 9$

Graph the Function:

$$f(x) = \frac{x^2 - x - 6}{2x - 2}$$



Identify each point of discontinuity, holes, vertical asymptote, horizontal asymptote, zero(s), y-intercept, domain, ~~and range.~~

Slant Asymptote

$X+4=0$
$X=-4$

top = 0
$X-4=0$

#1

$f(x)=\frac{x-4}{-4x-16}$ $\frac{x-4}{-4(x+4)}$

Zeros: $X=4$

y-intercepts: $\frac{0-4}{-4(0)-16}=\frac{-4}{-16}$ $(0,\frac{1}{4})$ $\frac{1}{4}$

Points of Discontinuity: $X=-4$

Hole: None

Vertical Asymptote: $X=-4$

Horizontal Asymptote: $Y=-\frac{1}{4}$

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

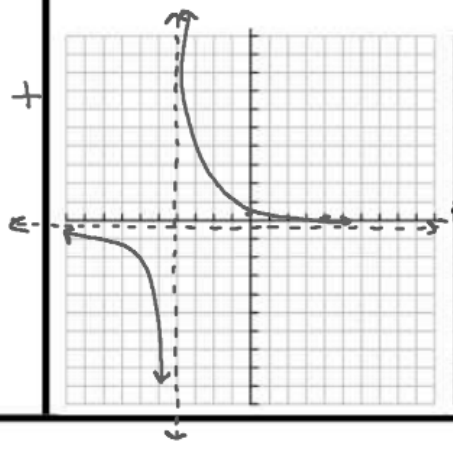
Slant Asymptote: None

$X=3.5$

$\frac{3.5-4}{-4(35)-16}$ $\frac{-}{-}$ +

$X=-5$

$\frac{-5-4}{-4(-5)-16}$ $\frac{-}{+}$



$f(x)=\frac{4}{x^2-3x}=\frac{4}{X(X-3)}$

Zeros: None

y-intercepts: None

Points of Discontinuity: $X=0,\ X=3$

$X(X-3)=0$
$X=0$ $X-3=0$
$X=3$

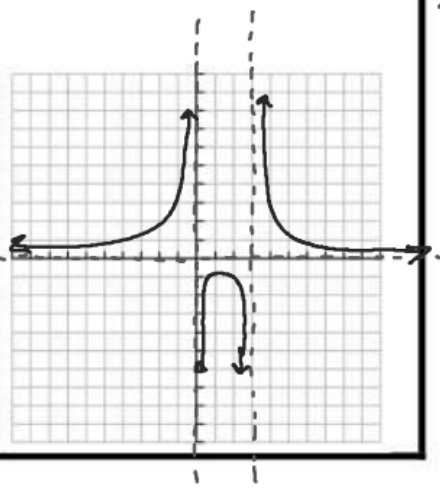
Hole: None

Vertical Asymptote: $X=0$ $X=3$

Horizontal Asymptote: $Y=0$

Domain: $(-\infty,0)\cup(0,3)\cup(3,\infty)$

Slant Asymptote: None



$\frac{4}{x^2-3x}$

$X=4$ $\frac{+}{+}$ ↑

$X=2$ $\frac{+}{-}$ ↓

$X=1$ $\frac{+}{-}$ ↓

$X=-1$ $\frac{+}{+}$ ↑

$x(x-3)(x+3)$

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

$\frac{0^3-9(0)}{3(0)^2-6(0)-9} \quad \frac{0}{-9}$

$x=-.5$

$\frac{x^3-9x}{3x^2-6x-9}$

$f(x)=\frac{x^3-9x}{3x^2-6x-9}$ $\frac{x(x-3)(x+3)}{3(x-3)(x+1)}$

Zeros: $x=0$ ~~$x=3$~~ $x=-3$

y-intercepts: $(0,0)$

Points of Discontinuity: $x=-1, x=3$

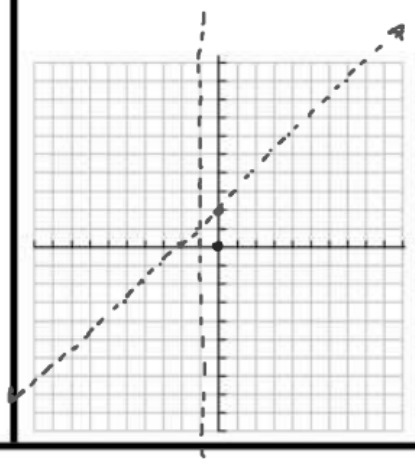
Hole: $x=3$

Vertical Asymptote: $x=-1$

Horizontal Asymptote: None

Domain: $(-\infty,-1)\cup(-1,3)\cup(3,\infty)$

Slant Asymptote: $y=x+2$



$f(x)=\frac{3x^2-12x}{x^2-2x-3}$

Zeros:

y-intercepts:

Points of Discontinuity:

Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Slant Asymptote: