

12. (11 pts) Given $f(x) = \frac{-3x^2 + 3}{(x-9)(x+4)}$ Identify the following:

a) Domain of $f(x)$: $x \neq 9, -4$

b) y-intercept if any: $-\frac{1}{12}$ $x=0$ $\left(\frac{3}{(-9)(4)}\right) = -\frac{3}{36}$

c) x-intercept(s), if any: ± 1 $y=0$ top $= 0$ $-3x^2 + 3 = 0$
 $x^2 = 1$

d) Vertical asymptote(s) if any, $x =$ $9, -4$ bottom $= 0$

e) Horizontal asymptote(s) if any, $y =$ $-\frac{3}{1}$ Powers same
coef $-\frac{3}{1}$

f) $f(-1) =$ 0 $\frac{-3(-1)^2 + 3}{(-1-9)(-1+4)} = 0$

13. (8 pts) Use the graph of the rational function at right to complete the following:

a.) What is the horizontal asymptote?

$y =$ 0

b.) What is the vertical asymptote?

$x =$ 2

c.) As $x \rightarrow 2^+$, $f(x) \rightarrow$ $+\infty$

d.) As $x \rightarrow 2^-$, $f(x) \rightarrow$ $-\infty$

e.) As $x \rightarrow -\infty$, $f(x) \rightarrow$ 0

f.) As $x \rightarrow \infty$, $f(x) \rightarrow$ 0

