3. (*18 points*) Consider the polynomial function $H(x) = \frac{x+1}{x(x+4)}$.

a. (*6 pts*) Find the vertical and horizontal asymptotes of $H(x)$.

v. asy. : $x(x+4)=0$

$\Rightarrow \boxed{x=0}$ or $x+4=0$

$\boxed{x=-4}$

+3

−1 forgot a zero

−1 sign

−1 bad answer

h. asy. : $y=0$ (degree of top < degree of bottom)

+3

b. (*6 pts*) Find the x-intercept and y-intercept of $H(x)$.

x-intercept : $H(x)=0 \Rightarrow \frac{x+1}{x(x+4)}=0$

$\Rightarrow x+1=0$

$\Rightarrow x=-1$

+3

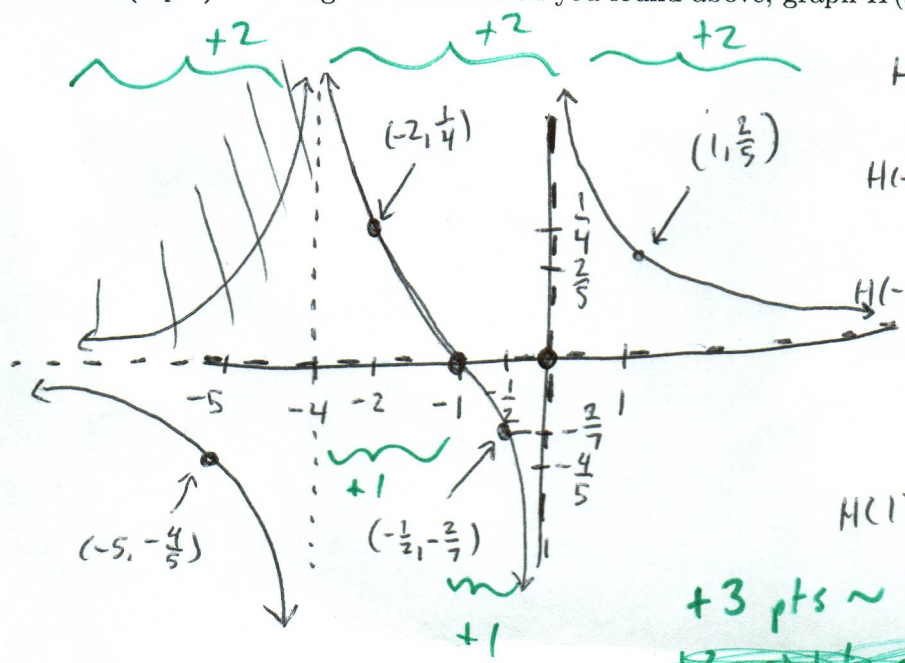
y-intercept: $H(0)=\frac{0+1}{0(0+4)}=\cancel{\frac{1}{0}}$

BAD!!

$\Rightarrow$ No y-intercept

+3

c. (*6 pts*) Using the information you found above, graph $H(x)$.



$H(-5)=\frac{-5+1}{-5(-5+4)}=\frac{-4}{-5(-1)}=-\frac{4}{5}$

$H(-2)=\frac{-2+1}{-2(-2+4)}=\frac{-1}{-2(2)}=\frac{-1}{-4}=\frac{1}{4}$

$H(-\frac{1}{2})=\frac{-\frac{1}{2}+1}{(-\frac{1}{2})(-\frac{1}{2}+4)}=\frac{\frac{1}{2}}{\frac{1}{4}-2}=\frac{\frac{1}{2}}{-\frac{7}{4}}$

$=\frac{-4}{14}=-\frac{2}{7}$

$H(1)=\frac{1+1}{1(1+4)}=\frac{2}{5}$

+3 pts ~ include all info you found

~~+3 straight one detailed~~