There once was a crab named Clay
His favorite thing to do is to play
With Rational Functions
First he has to factor his equation
And this little crustacean
Doesn't want any disfunction

If there is a common factor on the top and bottom
At least that's what his teacher taught him
Take the number from the factor and flip the sign

This means there's a hole known as a removable discontinuity
Thank goodness for Clay's ingenuity
When this number is plugged into the equation it comes out as undefined

When graphing this equation draw a circle on the hole
This makes Clay's graph whole
Looking at the numerator again

Flipping the sign of the numbers from the factors finds the x intercepts
Wow what cool concept!
This will help Clay make so many friends

In a similar style
Looking at the denominator and flipping the sign of the number in the factor will make Clay's time all worth while
These are Clay's vertical asymptotes

Plug your x intercept back into the equation
To solve for the y intercept station
To find the horizontal and slant asymptotes

Looking at the degrees of the numerator and denominator
If the denominator's degree is larger can this trick get any greater
0 is Clay's horizontal asymptote

If the numerator's degree is larger
Clay tells his father
That there is a slant asymptote

If the numerator and denominator's degrees are the same
Then horizontal is this asymptote's name
Clay loves asymptotes!

This means Clay uses leading coefficient division
To find his mission

Which gives him the horizontal asymptote

To use these special tricks
Something in Clay's brain clicks
When x is applied as infinity

The numbers in the factor are so minuscule compared to the degree
So for the horizontal asymptotes it's the degree that matters to me
Says Clay with sanguinity

The end behavior is where f(x) is approaching
When x approaches negative or positive infinity Clay is noting
Yay end behavior!

Lastly Clay must complete his sign lines
Sign lines tell Clay which directions the lines on the graph will go which makes all things fine
So Clay doesn't experience failure

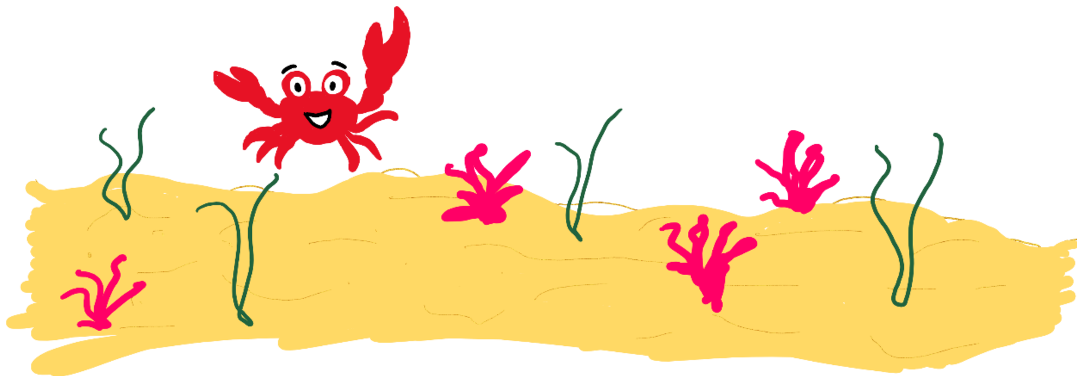
Clay must use the factors in both numerator and denominator
He creates a number line with all the numbers of the factors going from least to greater
Then chooses numbers around the numbers on the number line

He plugs these new numbers into the factors
This sign line is such a benefactor
He then solves for the overall sign

Now it's time for Clay to graph
Look at his work to the right; Clay is so excited he can't help but laugh
Clay notices that some points are excluded from the domain and range because of the removable hole

As Clay looks over his work, he is so overjoyed
Because rational functions will not make him unemployed
His dreams are to become a math teacher just like his friend Cole

To celebrate he listens to the 10 hour Crab Rave
A song created by his dad Dave
We love rational functions! Crab Rave 10 Hours



$$h(x)=\frac{(x+1)(x^2-x-6)}{(2x-4)(x^2+5x+6)}$$

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

discontinuity:
hole at $x=-2$

horizontal asymptote:
EATSDC: $y=\frac{1}{2}$

x intercepts: $(-1,0),(3,0)$

vertical asymptote:
$x=2, x=-3$

$f(0)=\frac{(2)(-3)}{2(-2)(6)}$
$=\frac{-6}{-24}$
$=\frac{1}{4}$

D: $(-\infty,-3)\cup(-3,-2)\cup(-2,2)\cup(2,\infty)$

R: $(-\infty,\infty)$

$\leftarrow -10 \mid -4 \mid 0 \mid 2.5 \mid 4 \rightarrow$ (divisions at $-6$, $-2$, $2$, $3$)

| | $-10$ | $-4$ | $0$ | $2.5$ | $4$ |
|---|---|---|---|---|---|
| $x+1$ | - | - | + | + | + |
| $x-3$ | - | - | - | - | + |
| $x-2$ | - | - | - | + | + |
| $x+6$ | - | + | + | + | + |
| overall | - | - | + | - | + |