

HAT
More Rational Functions

1/22/18

AMC
American Mathematics Contest

February 7, 2018
(Wednesday)
Periods 1 - 3
Auditorium

All HAT students are expected to participate.

Warm Up: (NC) Graph $f(x) = \frac{(x+2)^2(x-5)}{(x-3)(x+1)^2}$ $\frac{-20}{-3}$

Be sure to account for...

$(x^2+4x+4)(x-5)$
 $x^3 + \dots$

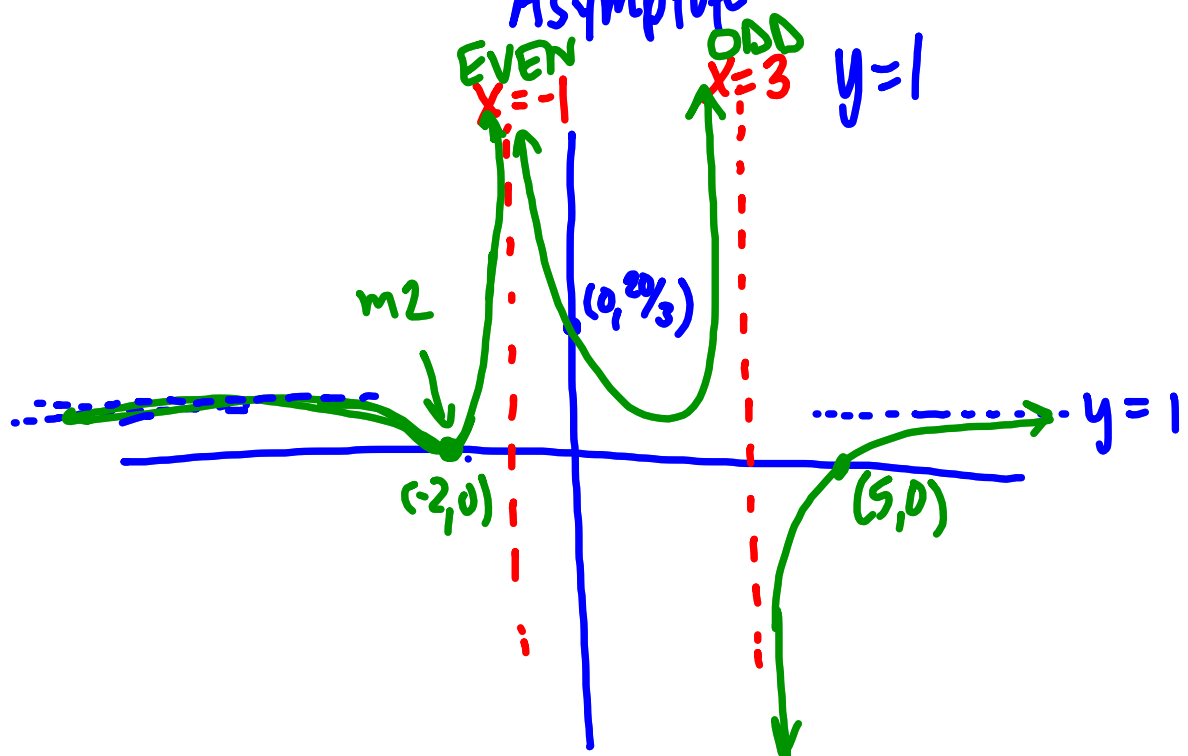
- x- and y-intercepts and multiplicities
- vertical and horizontal asymptotes (even vs. odd)

x-int: $(-2, 0)_{m2}$
 $(5, 0)$

Vertical Asymptotes: $x=3$ ODD
 $x=-1$ EVEN

y-int: $(0, \frac{20}{3})$

Horizontal Asymptote: $y=1$ $\frac{\textcircled{1}}{x^3 + \dots}$

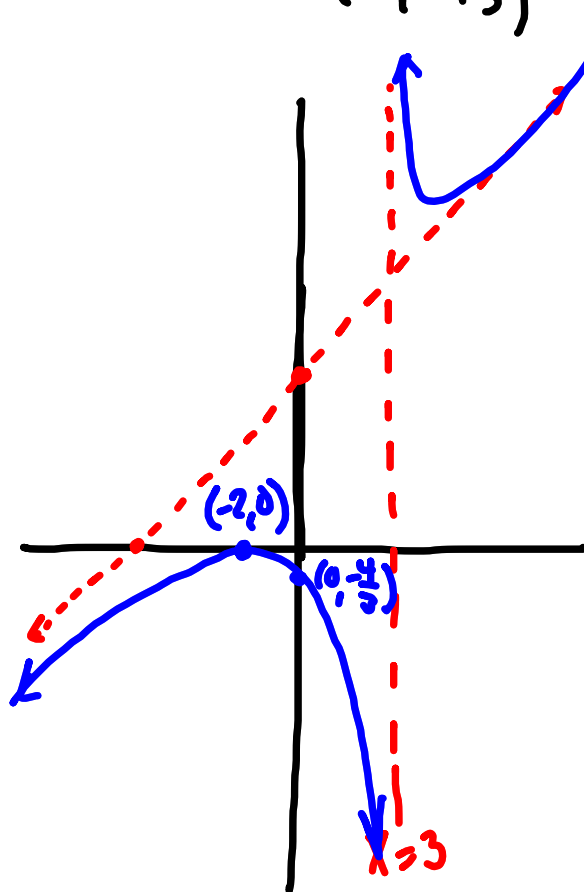


Ex#1: Use your calculator to graph $f(x) = \frac{(x+2)^2}{(x-3)}$

Note the similarities/differences between this graph and the graphs from yesterday's class and HW.

How do specific features of the graph show up in the equation?

x-int: $(-2, 0)$ m2 Vert asymptote: $x=3$
 y-int: $(0, -4/3)$ ODD



$$x-3 \overline{\begin{array}{r} x+7 \\ x^2+4x+4 \\ -(x^2-3x) \\ \hline 7x+4 \end{array}}$$

Oblique asymptote:

$$y = x + 7$$

Ex#2: Use your calculator to graph $f(x) = \frac{(x+2)(x-1)}{(x-3)}$

Note the similarities/differences between this graph, the graph from Ex#1, and the graphs from yesterday.

How do specific features of the graph show up in the equation?

x-int: $(-2, 0)$
 $(1, 0)$

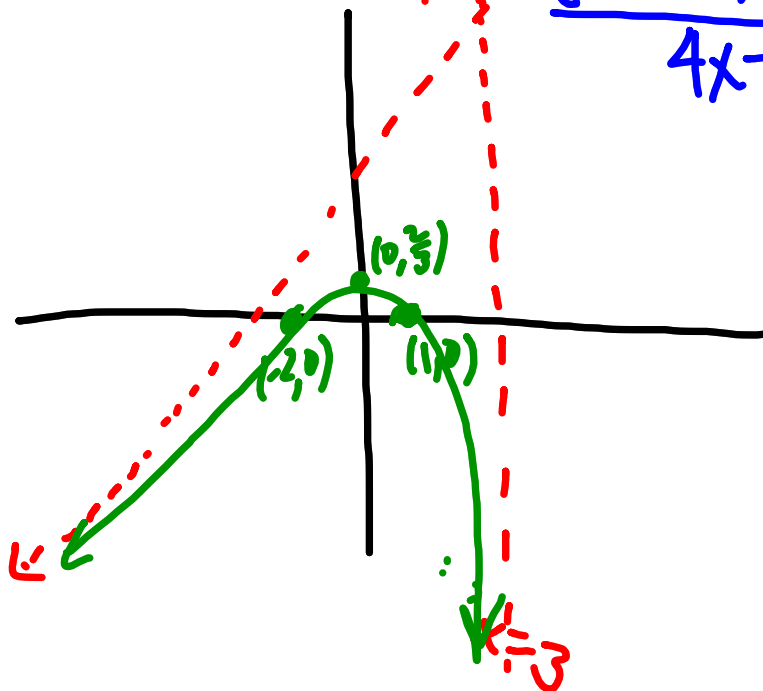
y-int: $(0, \frac{2}{3})$

Vertical Asymptote: $x=3$ odd

Horizontal/Oblique Asymptote:

$$x+3 \overline{) \begin{array}{r} x^2 + x - 2 \\ -(x^2 - 3x) \\ \hline 4x - 2 \end{array}}$$

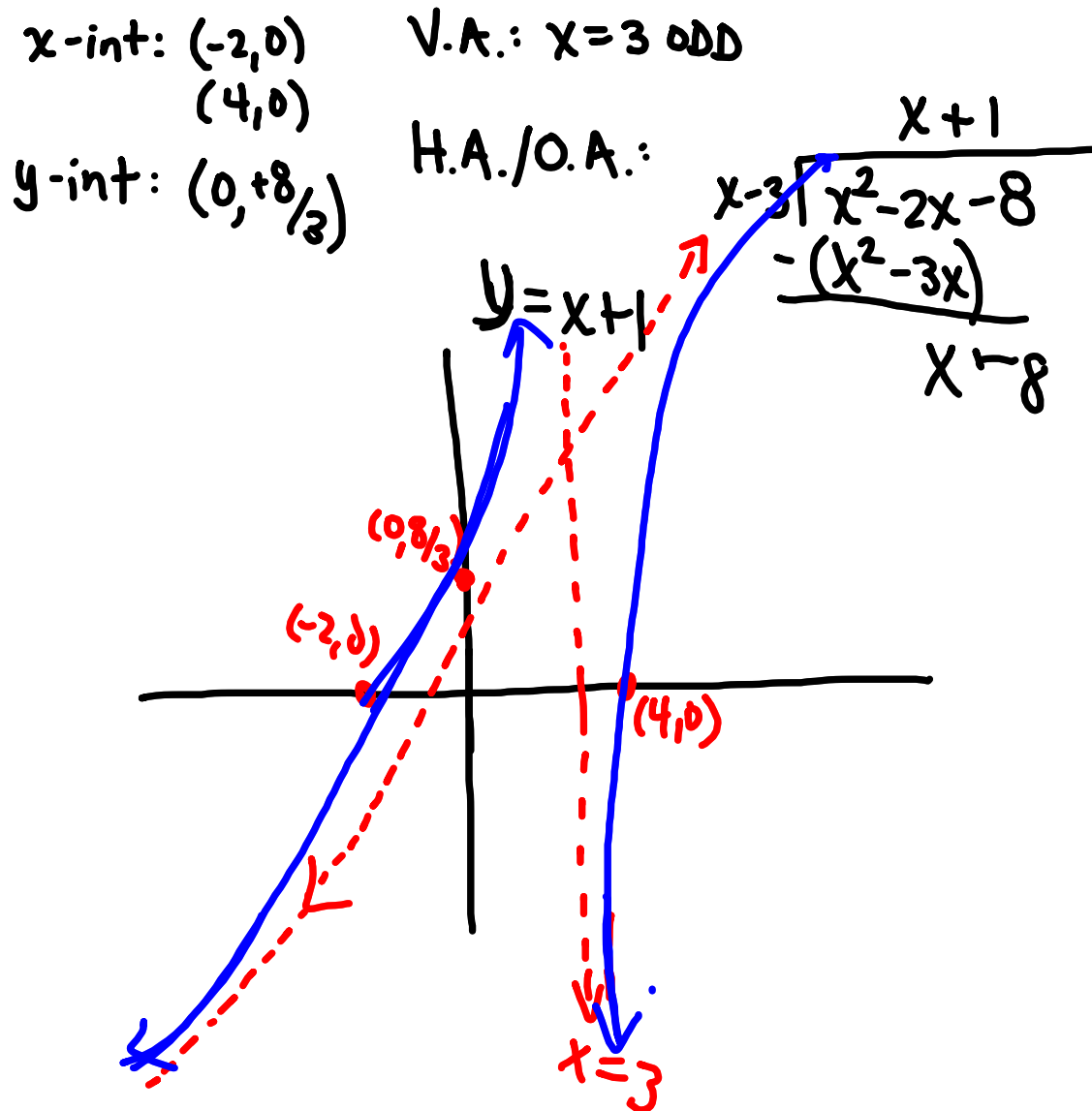
$y = x + 4$



Ex#3: Use your calculator to graph $f(x) = \frac{(x+2)(x-4)}{(x-3)}$

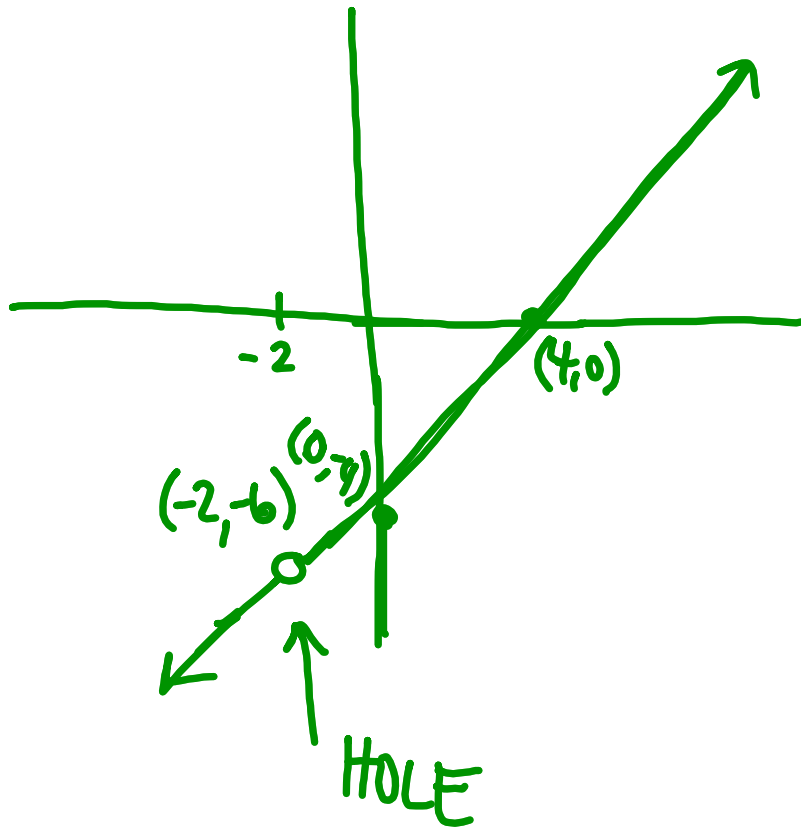
Note the similarities/differences between this graph and previous graphs.

How do specific features of the graph show up in the equation?



Ex#4: (NC) Graph $f(x) = \frac{(x+2)(x-4)}{(x+2)}$ HOLE

$$f(x) = x - 4$$



Ex#5: (NC) Graph $f(x) = \frac{x^2 - x - 12}{x^2 - 5x + 6}$

$$\frac{(x-4)\cancel{(x+3)}}{(x+2)\cancel{(x+3)}}$$

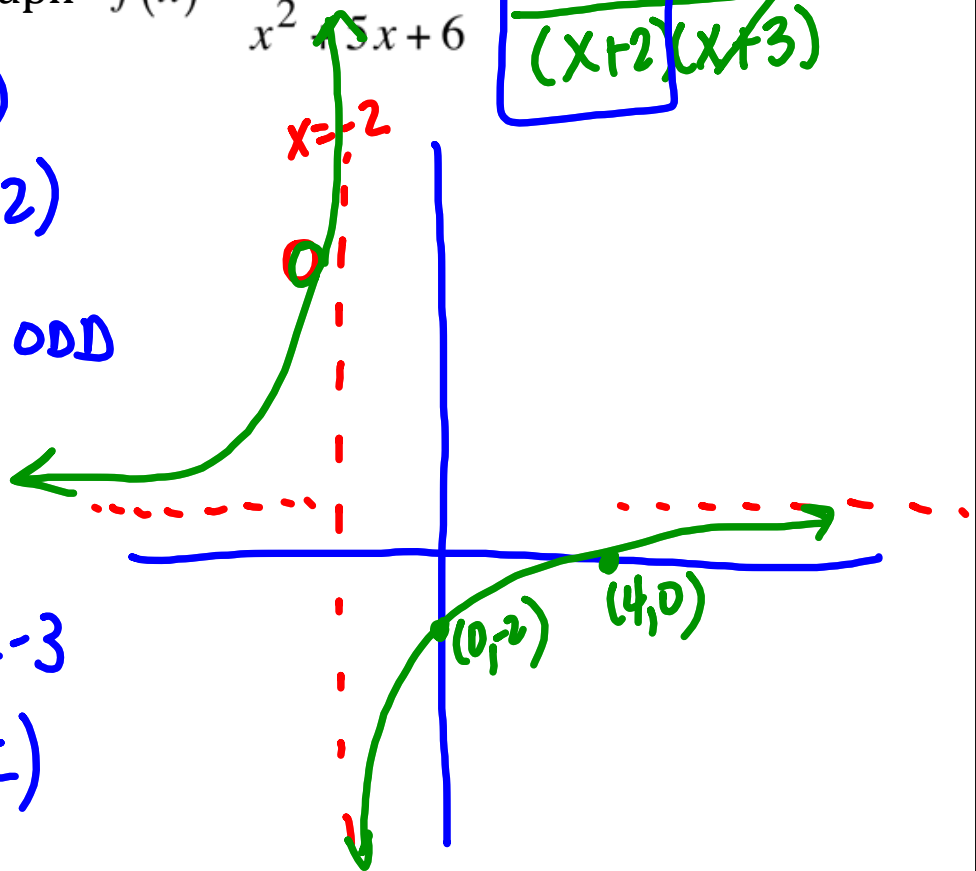
x-int: $(4, 0)$

y-int: $(0, -2)$

V.A: $x = -2$ ODD

H.A: $y = 1$

HOLE: $x = -3$
 $(-3, 7)$



Ex#6: (NC) Graph $f(x) = \frac{x^3 + x^2 - 22x - 40}{x^3 - 4x^2 - 12x + 18}$

*NC?!? What?!?
Is he kidding?*

Assignment: (NC) page 558 #19, 21, 25, 26, 33, 35, 41

January 22, 2018

