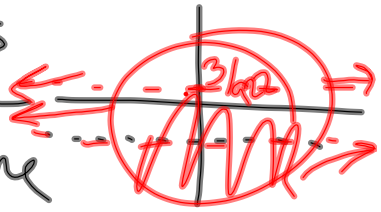
Horizontal Asymptotes



Case 1 degrees same

H.A. : y = ratio of leading coefficients

e.g. $\frac{3x^5-2x^4+3}{922x^5-3x^2} \approx \frac{3x^5}{922x^5} \approx \frac{3}{922}$

Case 2 degree of denominator is larger than deg. of numerator

e.g. $\frac{2x^3-3x^2+x}{x^5-2x+7} \approx \frac{2x^3}{x^5} \approx \frac{2}{x^2}$

as $x \to \pm\infty$

H.A. is always $y=0$

Case 3 Oblique Asymptote

deg. of numerator is larger than deg of denominator

e.g. $\frac{2x^5-3x^3+2x^2-4}{x^4-1} \approx \frac{2x^5}{x^4} \approx 2x$

O.A. $\approx y=2x$

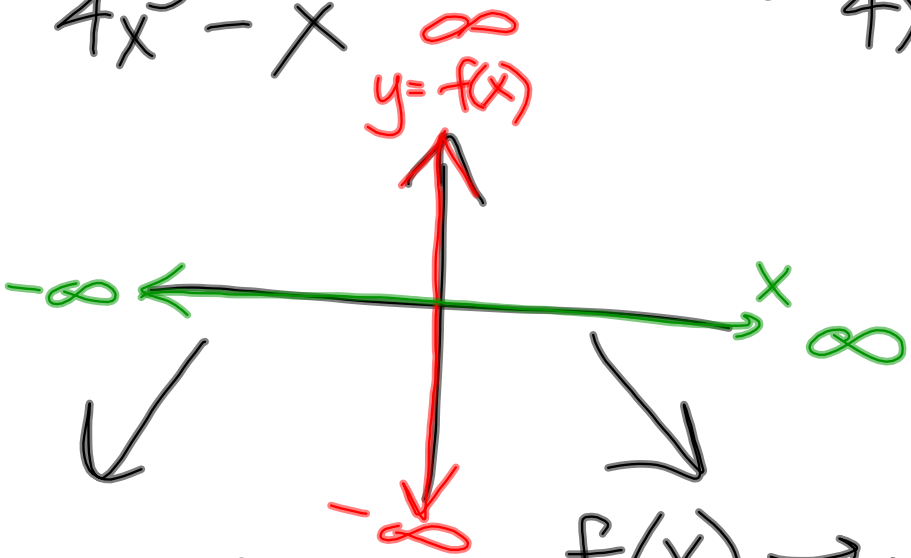
linear, positive slope

as $x \to +\infty$, $f(x) \to +\infty$

as $x \to -\infty$, $f(x) \to -\infty$

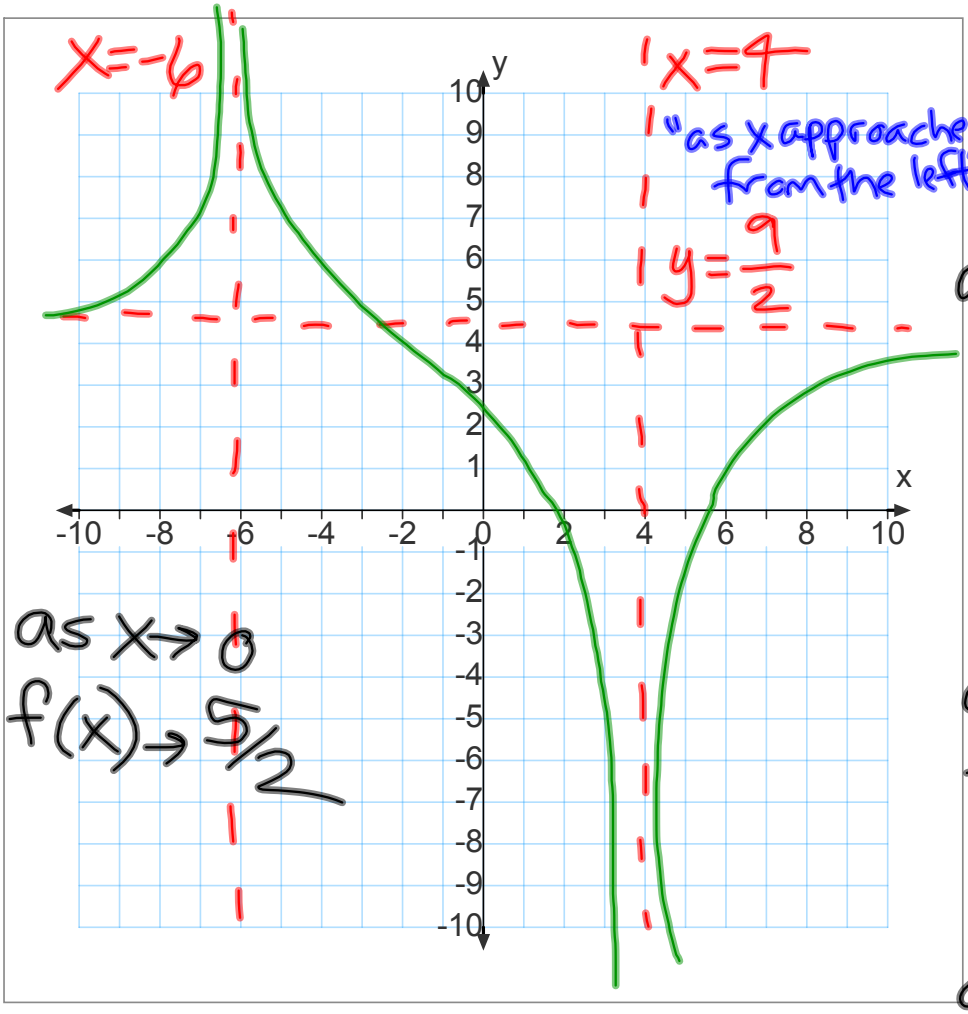
$$\frac{-2x^7+3x^4-2}{4x^3-x} \approx \frac{-2x^7}{4x^3} = \frac{-x^4}{2}$$

negative, even degree



as $x \to \infty$, $f(x) \to -\infty$

as $x \to -\infty$, $f(x) \to -\infty$



as $x \to -6^-$
$f(x) \to \infty$

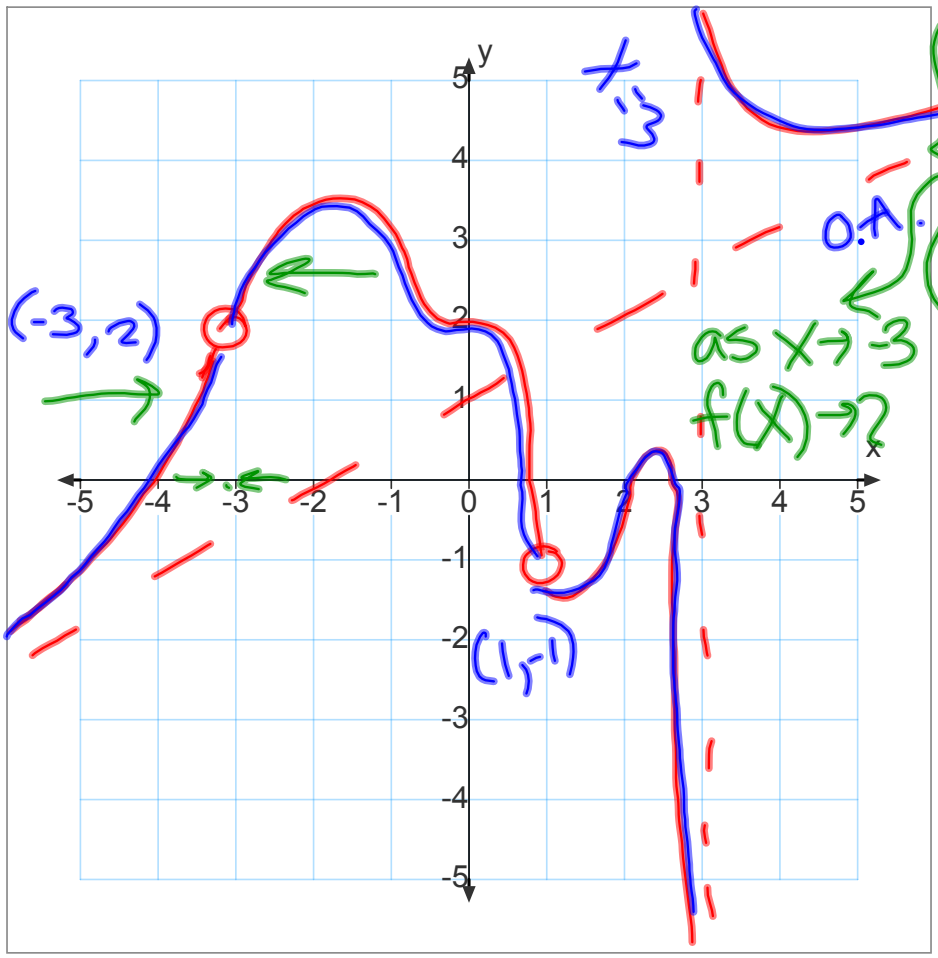
as $x \to -6^+$
$f(x) \to \infty$

as $x \to 4^-$
$f(x) \to -\infty$

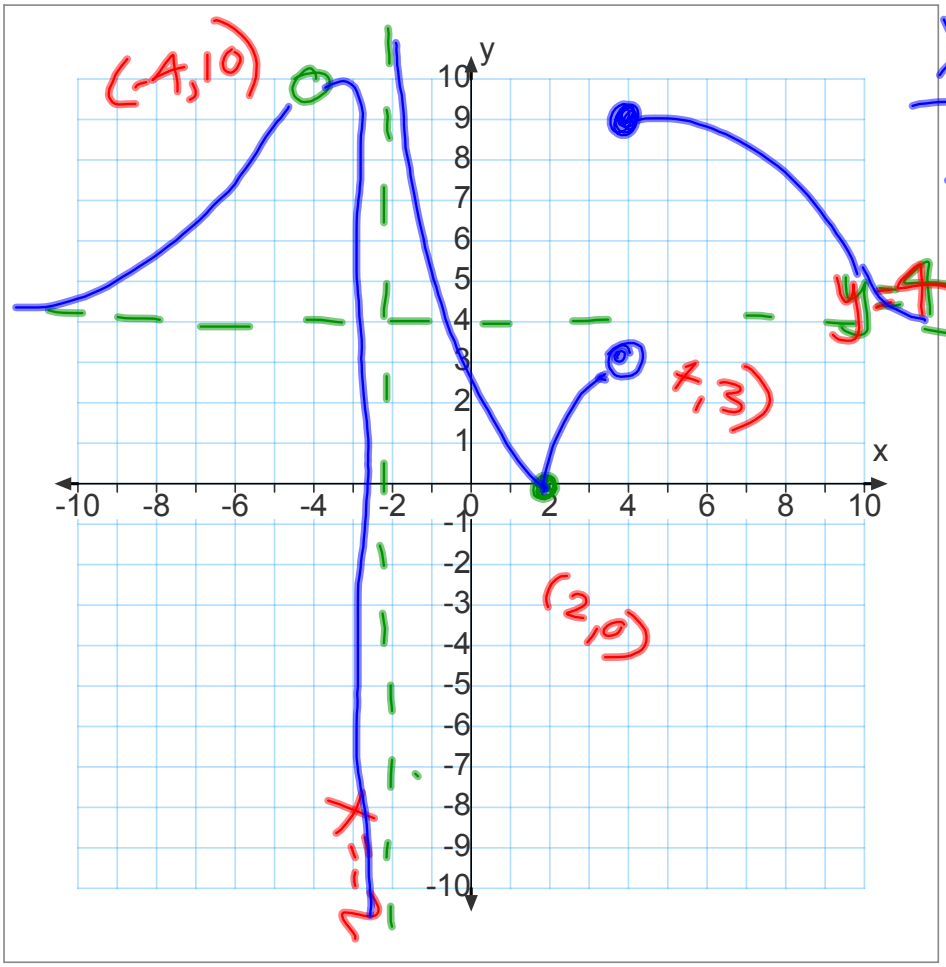
as $x \to 4^+$
$f(x) \to -\infty$

as $x \to \infty$
$f(x) \to 9/2$

as $x \to -\infty$
$f(x) \to 9/2$



as $x \to -3^-$
$f(x) \to 2$
$x \to -3^+$
$f(x) \to 2$
$x \to 1^-$
$f(x) \to -1$
$x \to 1^+$
$f(x) \to -1$
$x \to 3^-$
$f(x) \to -\infty$
$x \to 3^+$
$f(x) \to +\infty$
$f(x) \to +\infty$
$x \to -\infty$
$f(x) \to -\infty$



$X \to$	$f(x) \to$
-4^-	10
-4^+	10
-2^-	$-\infty$
-2^+	$+\infty$
2^-	0
2^+	0
4^-	3
4^+	4
∞	4
$-\infty$	4