Vertical asymptotes — set denom = 0 + solve ⟶ x = ___

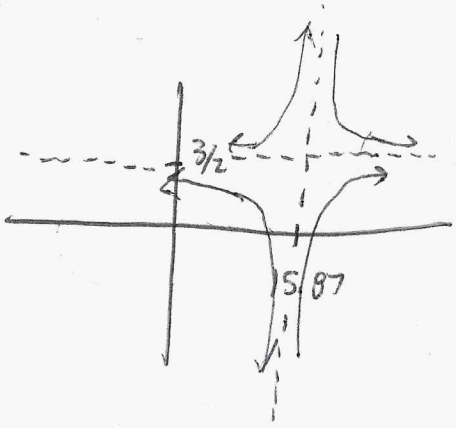
Horizontal asymptotes — $\dfrac{a_0+a_1x+\dots+a_nx^{n}}{b_0+b_1x+\dots+b_mx^{m}}$

- 0 ; if $m>n$
- no horiz asympt; $n>m$ (the graph goes to $\pm\infty$)
- $\frac{a_n}{a_m}$; if $m=n$

$\dfrac{2x^{2}+1}{3x^{0}-7}$ ($n=2$, $m=1$)

Ex: $f(x)=\dfrac{3x^{3}+2x-1}{2x^{3}-8000}$

Soln: [Find all V. & h. asymptotes; H. asymptote is at $\frac{3}{2}$]

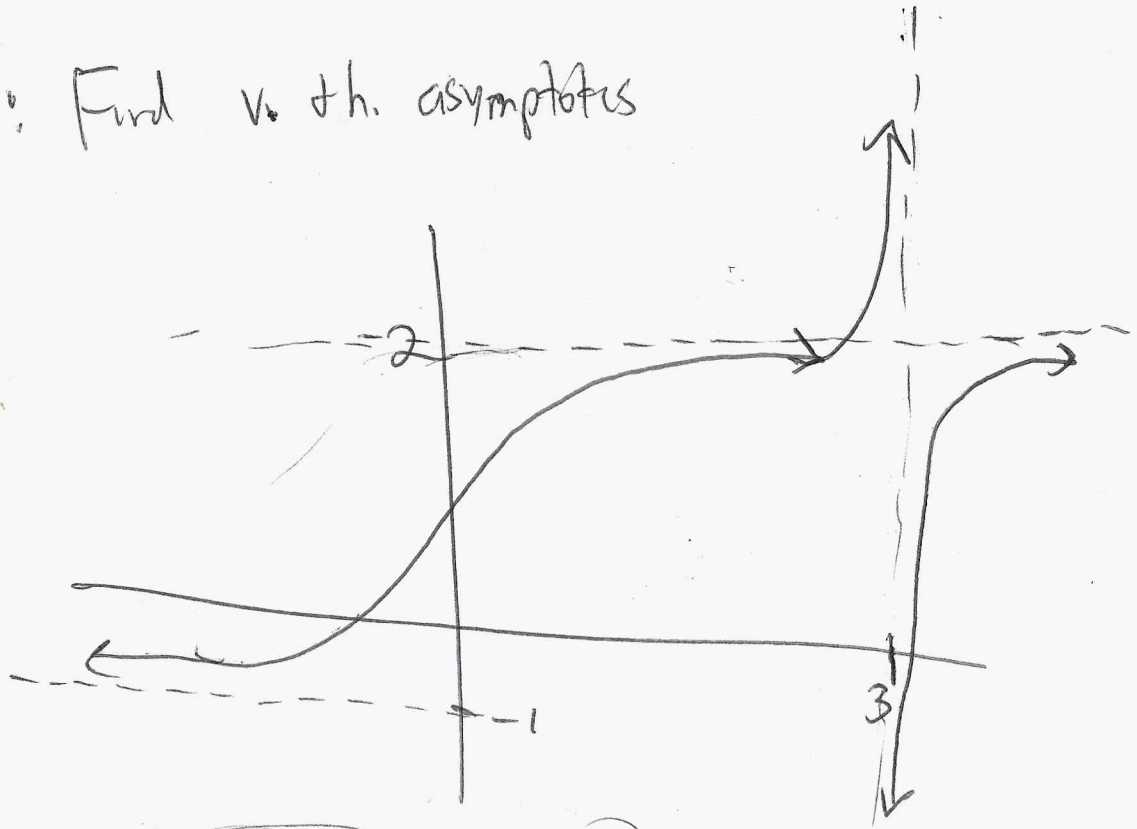


V. asyt: $2x^3-8000=0$

$2x^3=8000$

$x^3=4000 \rightarrow x=\sqrt[3]{4000} \approx 15.87$

Ex: Find v. & h. asymptotes



h. asymptotes: $y = -1$; $y = 2$

v. asymptote: $x = 3$

Ex: Solve $\frac{5}{n+1} + \frac{1}{3} = \frac{3}{2n}$

mult by $3(n+1)(2n)$

$5(3)(2n) + (1)(n+1)(2n) = 3(3)(n+1)$

$30n + 2n^2 + 2n = 9n + 9$

$2n^2 + 23n - 9 = 0$

$\frac{5}{n+1} - \frac{3}{2n} = -\frac{1}{3}$

$\frac{5(2n) - 3(n+1)}{(2n)(n+1)} = -\frac{1}{3}$

$\frac{10n - 3n - 3}{(2n)(n+1)} = -\frac{1}{3}$

$7n - 3 = -\frac{1}{3}(2n)(n+1)$

$7n - 3 = -\frac{1}{3}(2n^2 + 2n)$

mult by -3

$-21n + 9 = 2n^2 + 2n$

$0 = 2n^2 + 23n - 9$

QF

$n = \frac{-23 \pm \sqrt{23^2 - 4(2)(-9)}}{2(2)}$

$= -\frac{23}{4} \pm \frac{\sqrt{601}}{4}$

Ex: Solve

$$\frac{5}{3x-2} = \frac{-3}{x+11}$$

mult by $(3x-2)(x+11)$

$$5(x+11) = -3(3x-2)$$

$$5x+55 = -9x+6$$

$$14x = -49$$

$$x = \frac{-49}{14}$$

-55 6

55 6

Ex:

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

Solve for R_2

↓ multi. by RR_1R_2

$$R_1R_2 = RR_2 + RR_1$$

$$R_1R_2 - RR_2 = RR_1$$

$$R_2(R_1 - R) = RR_1$$

a number

$$R_2 = \frac{RR_1}{R_1 - R}$$