

① $x=4, m=3$

$x=3-t, m=1$

$x=-5, m=2$

Want real coefficients
after expanding, but
do not expand

$$f(x) = (x-4)^3(x-3-t)(x-(3+t))(x+5)^3$$

② $f(x) = 2x^5 - 7x^4 + 11x^2 + 4x - 5$

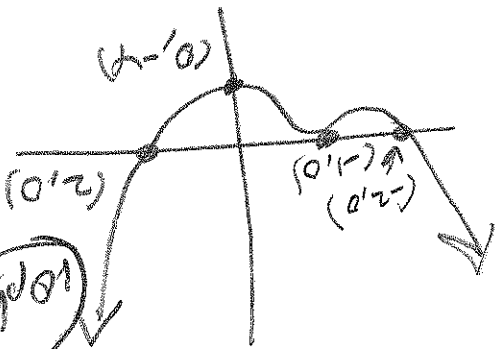
We find $P(x)$ by synthetic division

2	-1	-3	2	10	25 = P(3)
3	2	-7	0	11	4
		6	-3	-9	6
			30	6	

③ $\neq 2$ says $S_p B$

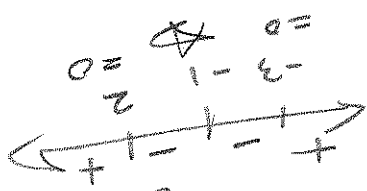
$$P(x) = (x-3)(2x^4 - x^3 - 3x^2 + 2x + 10) + 25$$

④ $f(x) = (x-2)(x+1)^2(x+2) = 8x^4 - 4$



⑤ $f(x) \leq 0$
 $x \in [-2, 2]$

$x \in (-\infty, -3] \cup [2, \infty)$



Factored \approx Complex #s

$$(x-1)^2(x+3)(x-(2+3i))(x-(2-3i))$$

$$x = \frac{2 \pm \sqrt{4 \pm \sqrt{36}}}{2} = \frac{2 \pm 6}{2} = 2 \pm 3i$$

$$x^2 - 4x + 13$$

No real zeros

$$16 - 52 = -36$$

$$b^2 - 4ac = (-4)^2 - 4(1)(13)$$

$$\begin{aligned} x = 1, m = 2 \\ x = -3, m = 1 \end{aligned}$$

$$(x-1)^2(x+3)(x^2+4x+13)$$

Factored \approx real #s

$$\begin{array}{r} \text{II} \quad 1 \quad -3 \quad 4 \quad -7 \quad 39 \\ \hline \text{I} \quad 1 \quad -2 \quad 2 \quad 38 \quad -39 \\ \hline \text{I} \quad 1 \quad -1 \quad 1 \quad 39 \\ \hline \text{I} \quad 1 \quad -4 \quad 13 \end{array}$$

$$f(x) = x^5 - 3x^4 + 4x^3 + 36x^2 - 77x + 39$$

(7)

Wir find oblique asymptote.

$$\frac{2x^3 - 5x^2 + 3x - 2}{x^2 + 4}$$

$$\frac{2x - 5}{2x^3 + 4} = \frac{-(2x^3 + 8x) + 5x^2 - 5x}{2x^3 - 4x^2 + x + 6} = \frac{-5x^2 - 5x - 10}{x^3 - 8x^2 + 17x - 10}$$

(8)

$$P: R \setminus \left\{ \frac{1}{2}, \frac{5}{2} \right\}$$

Hole (a) $x=2$

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

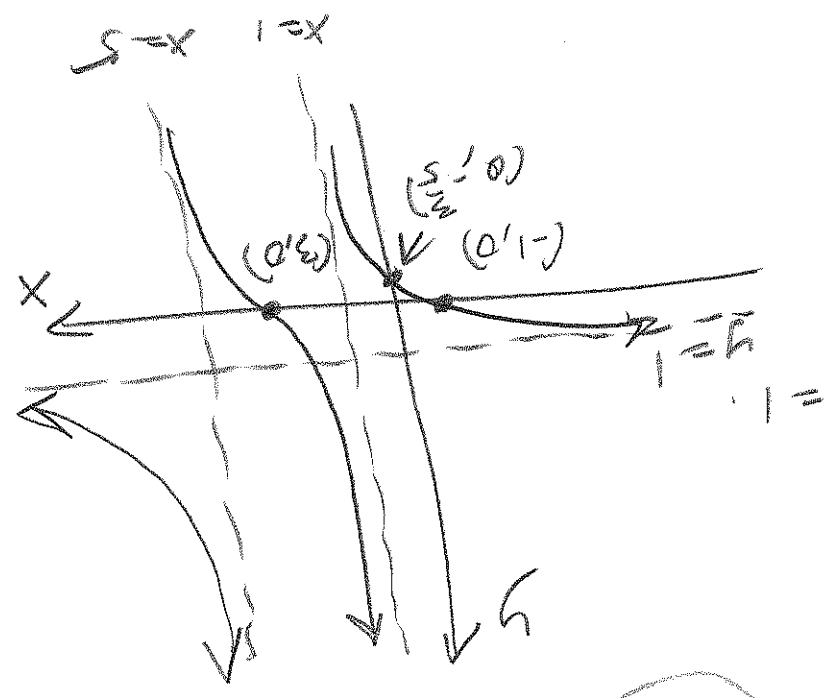
Hole (b) $x=5$

$$x=1, x=5 \text{ V.A.}$$

$$y=1 \text{ H.A.}$$

$$\left(1, -\frac{5}{2}\right) y \rightarrow \infty$$

$$(-1, 0), (3, 0) x \rightarrow \infty$$



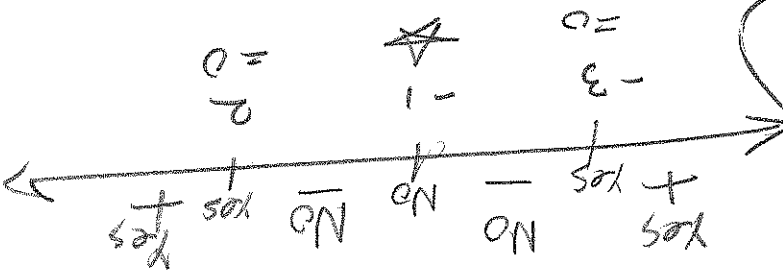
$$\frac{(x-2)(x-1)(x-5)}{(x-2)(x+1)(x-3)}$$

$$y = 2x - 5 \text{ O.A.}$$

$$x \in (-\infty, -3] \cup [2, \infty)$$

$$\text{Want } \frac{(x-2)(x+3)}{(x+1)^2} \geq 0$$

SPB



B2

$$\text{Want } \frac{(x-2)(x+3)}{(x+1)^2} < 0$$

Conjugate pairs for rational zeros

$$(x - (2 - \sqrt{5})) (x - (2 + \sqrt{5})) (x - (2 + 3i)) (x - (2 - 3i)) (x + 5)$$

SPB

Want rational coefficients after expanding, but don't expand

$$x = 2 - \sqrt{5}, m = 1$$

$$x = 2 + 3i, m = 2$$

$$x = -5, m = 1$$

B1

Spring '14

ONLINE E3

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