odd degree

$x^3 - 2x + 4$

$x^3 + 0x^2 - 2x + 4$ ← opp

$x = -2$

$x = 1 + i$

$x = 1 - i$

even degree — same

$2(x^4 + 2x^3 - 2x - 1) = 0$

-1

-1

-1

1

opp -2

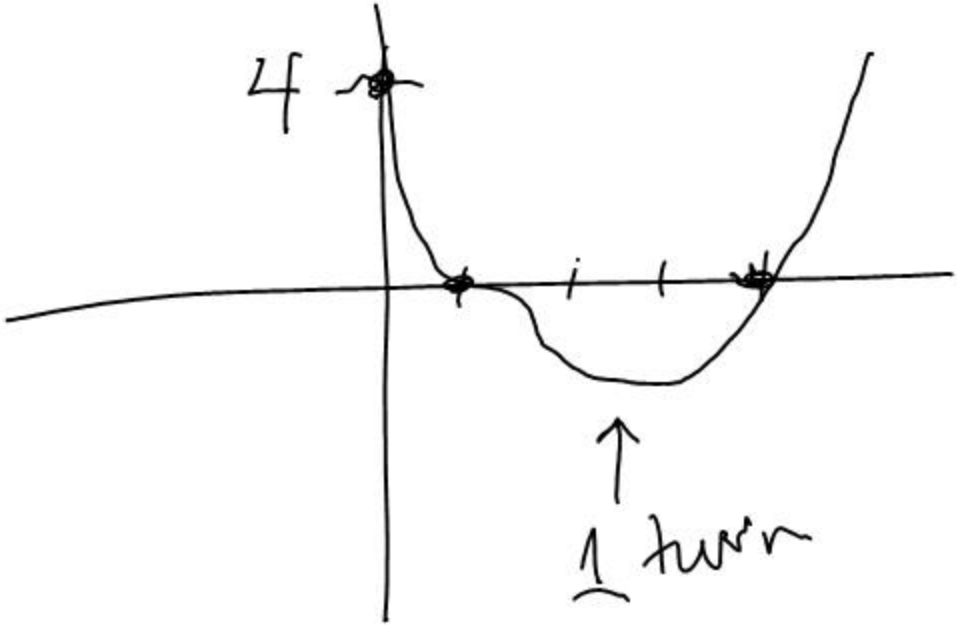
$(-1)(-1)(-1)(1) = -1$

conjugates

$a + b \longleftrightarrow a - b$

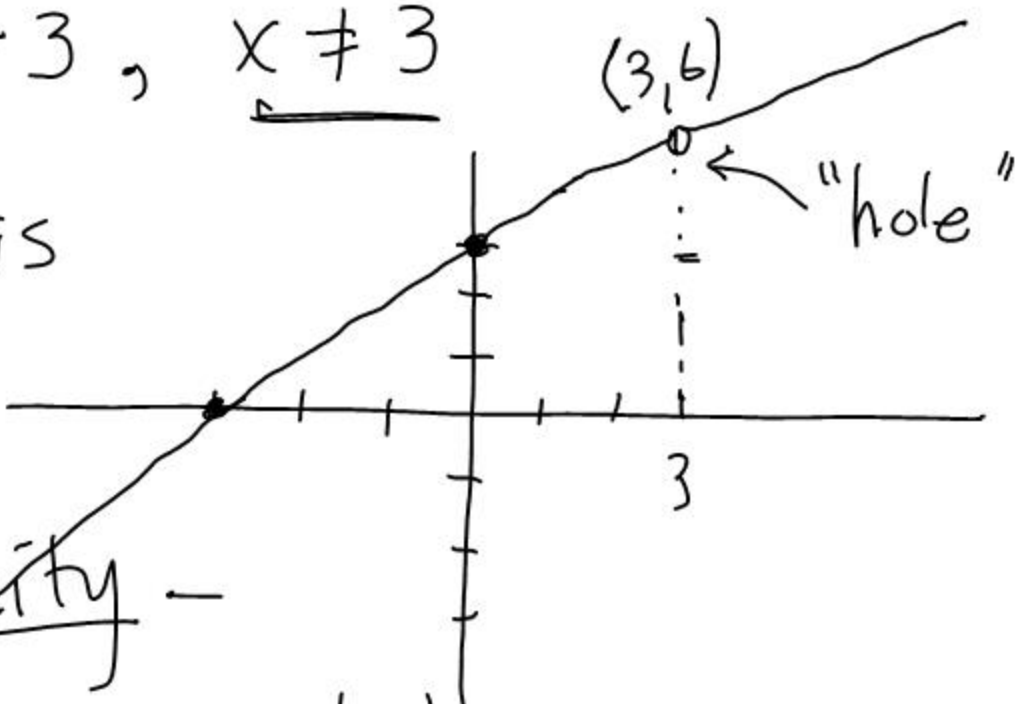
$(-2)(1+i)(1-i)$

$(-2)(1 + i - i + 1) = -4$



$$y = \frac{x^2 - 9}{x - 3}$$ Sketch

$y = x + 3, \; x \neq 3$



A "hole" is a removable discontinuity -

A vertical asymptote is an essential discontinuity

(c) $y = \dfrac{x^2+5x+6}{x^2+x-2}$ ← domain

$= \dfrac{(x+2)(x+3)}{(x+2)(x-1)}$

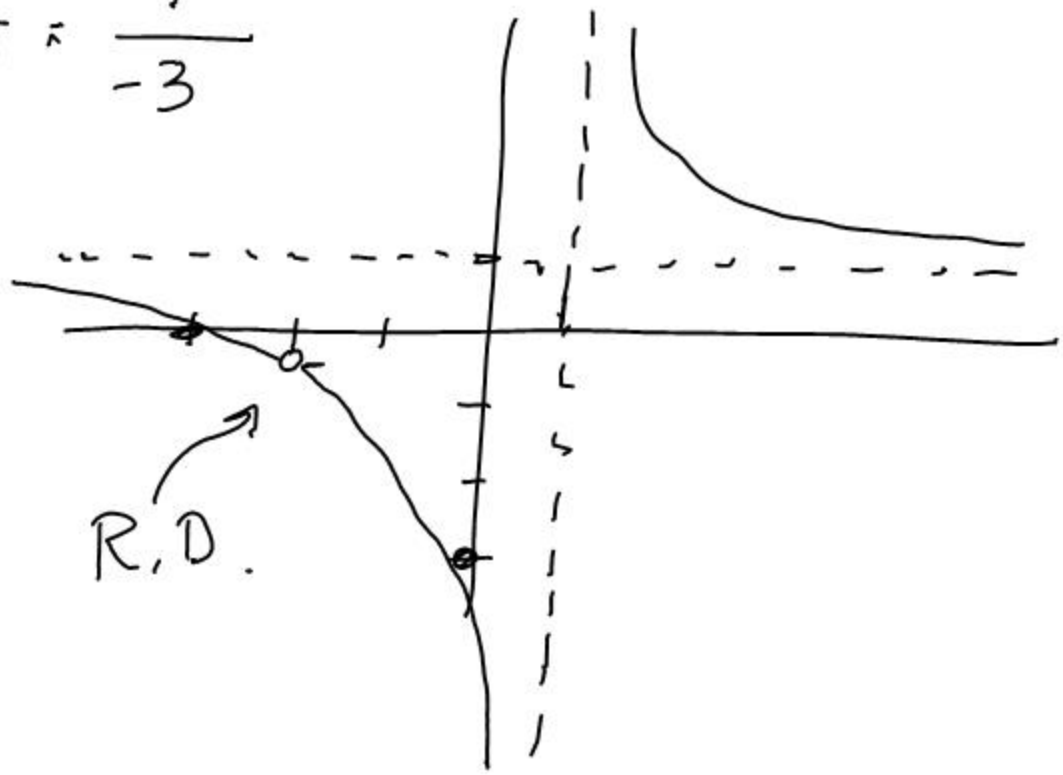
$= \dfrac{x+3}{x-1}, x \neq -2$

domain: $\mathbb{R} - \{1, -2\}$

- VA $x=1$
- NVA $y=1$
- x-int -3
- y-int -3
- RD $(-2, -\frac{1}{3})$

"hole" at $(-2, -\frac{1}{3})$

$\dfrac{-2+3}{-2-1} = \dfrac{1}{-3}$



Sketch $y = \dfrac{x^3 - x}{x^2 - 1}$

VA ____

HA ____

x-int.