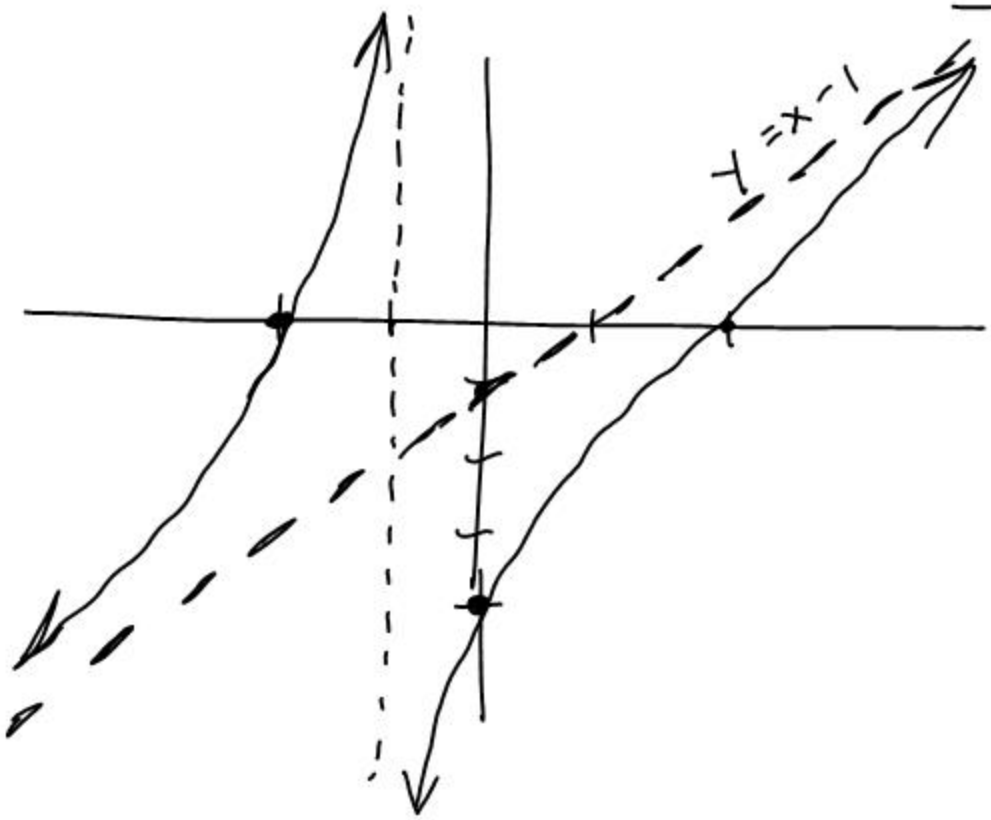
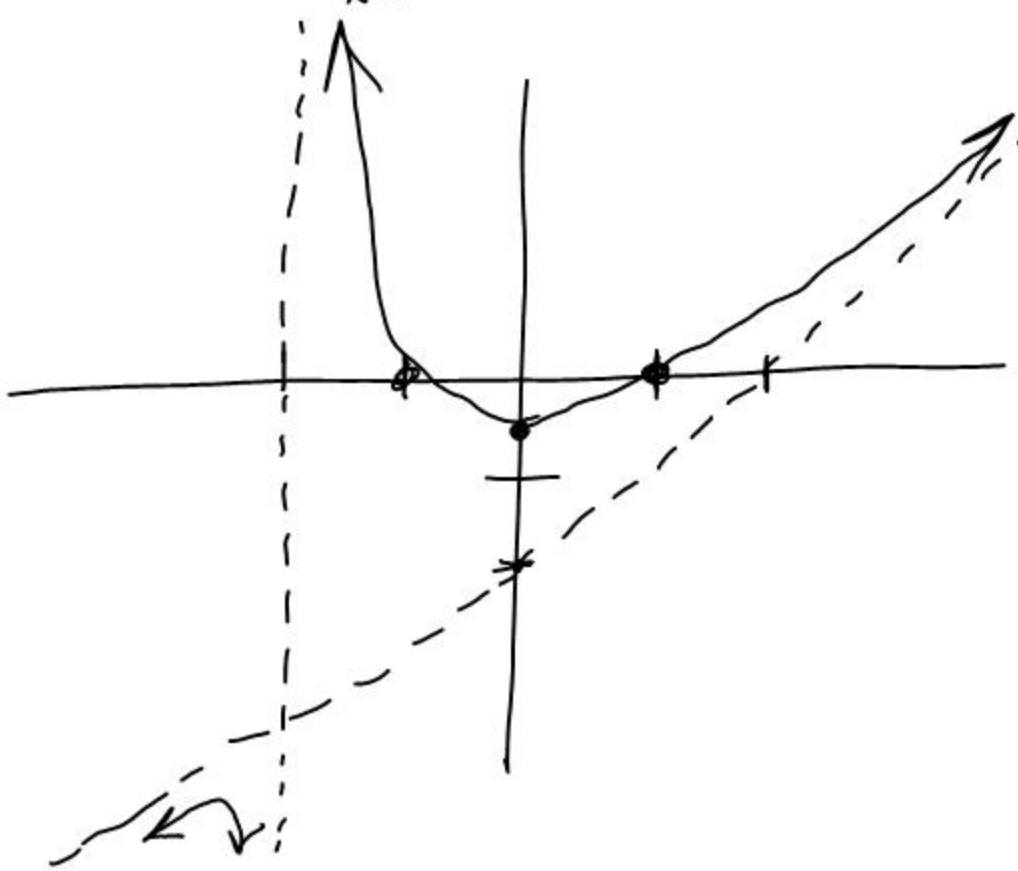
① $y = \dfrac{x^2-4}{x+1}$

$$x+1 \overline{)\, x^2 - 4} \quad \Big| \; x-1$$
$$-x^2 \mp x$$
$$-x-4$$

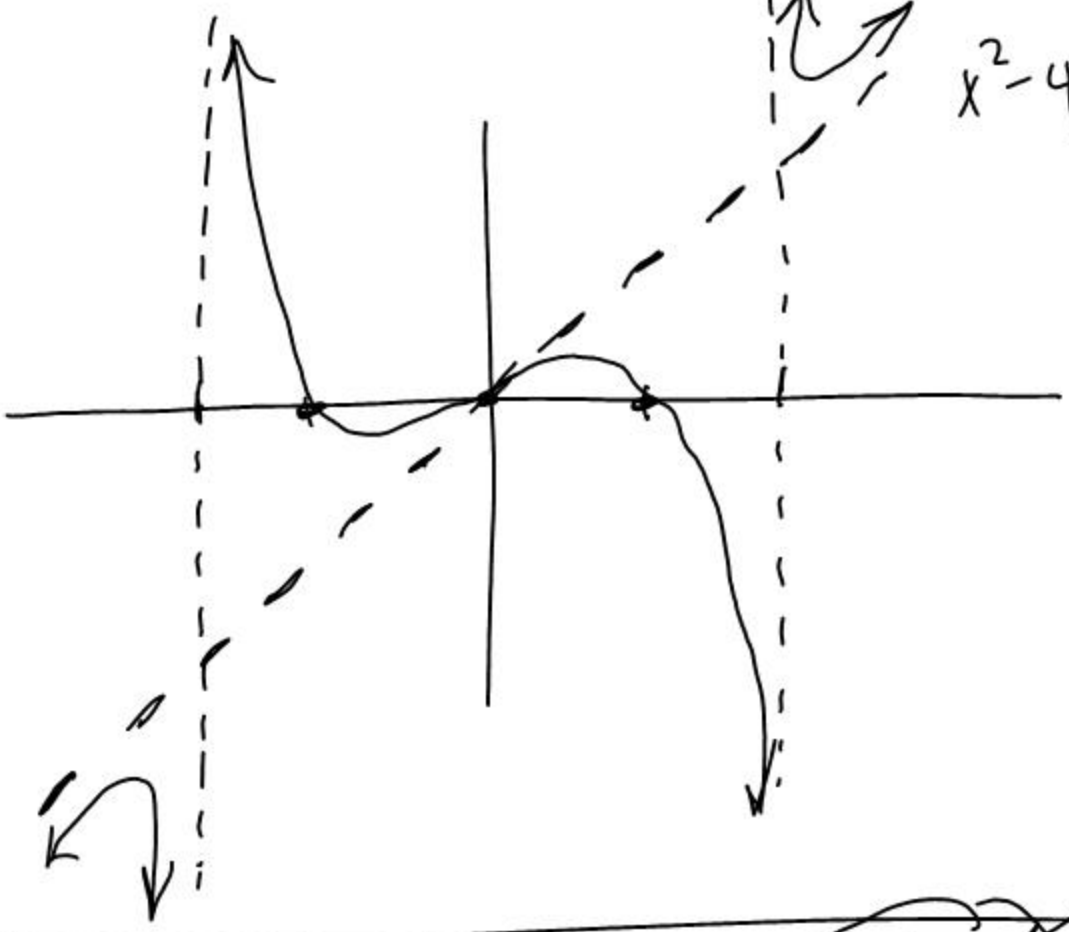


② $y = \dfrac{x^2-1}{x+2}$

$$y = x-2$$
$$x+2 \overline{)\, x^2 - 1}$$
$$-x^2 \mp 2x$$
$$-2x-1$$



$$y = \frac{x^3 - x}{x^2 - 4} = \frac{x(x+1)(x-1)}{(x-2)(x+2)}$$



$$x^2 - 4 \overline{)\, x^3 - x \,\Big|\, x}$$

$$-x^3 + 4x$$

$$3x$$

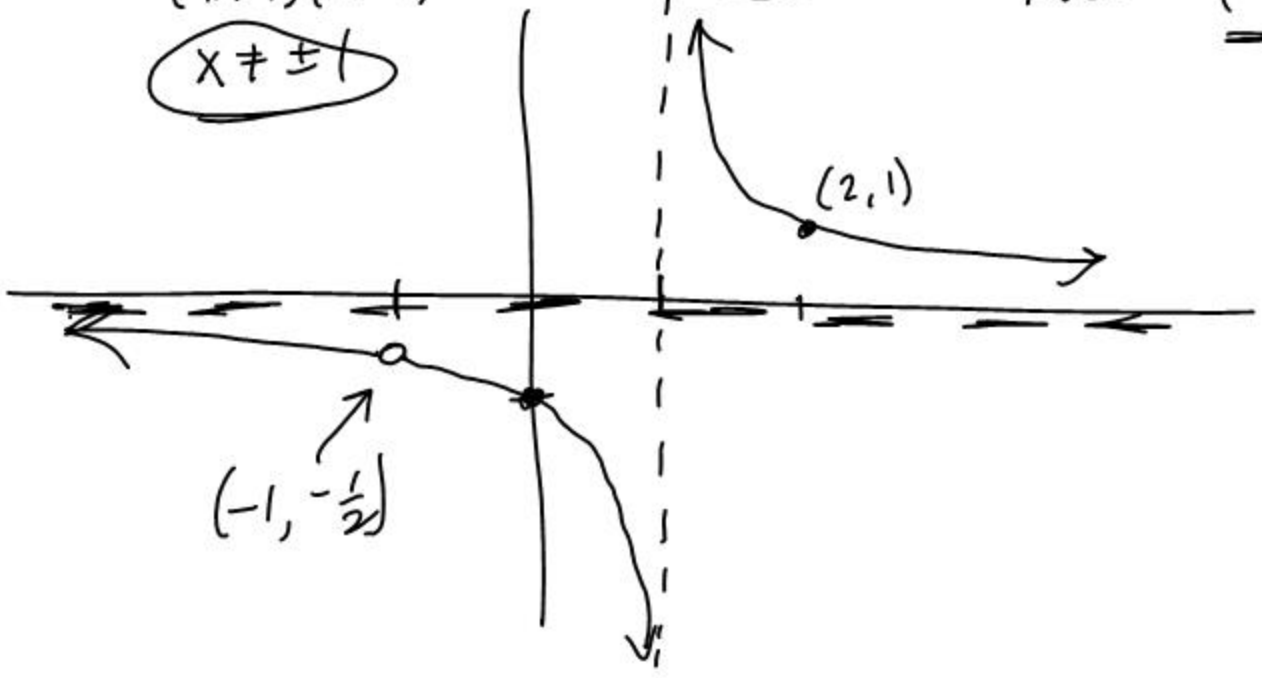
$$\frac{\left(\frac{1}{2}\right)^3 - \frac{1}{2}}{\left(\frac{1}{2}\right)^2 - 4} = \frac{+\frac{3}{8}}{+\frac{15}{4}}$$

④ $$y = \frac{x+1}{x^2-1} = \frac{1}{x-1}, \; x \neq -1$$

"hole" $\left(-1, -\frac{1}{2}\right)$

$$(x+1)(x-1)$$

$$x \neq \pm 1$$

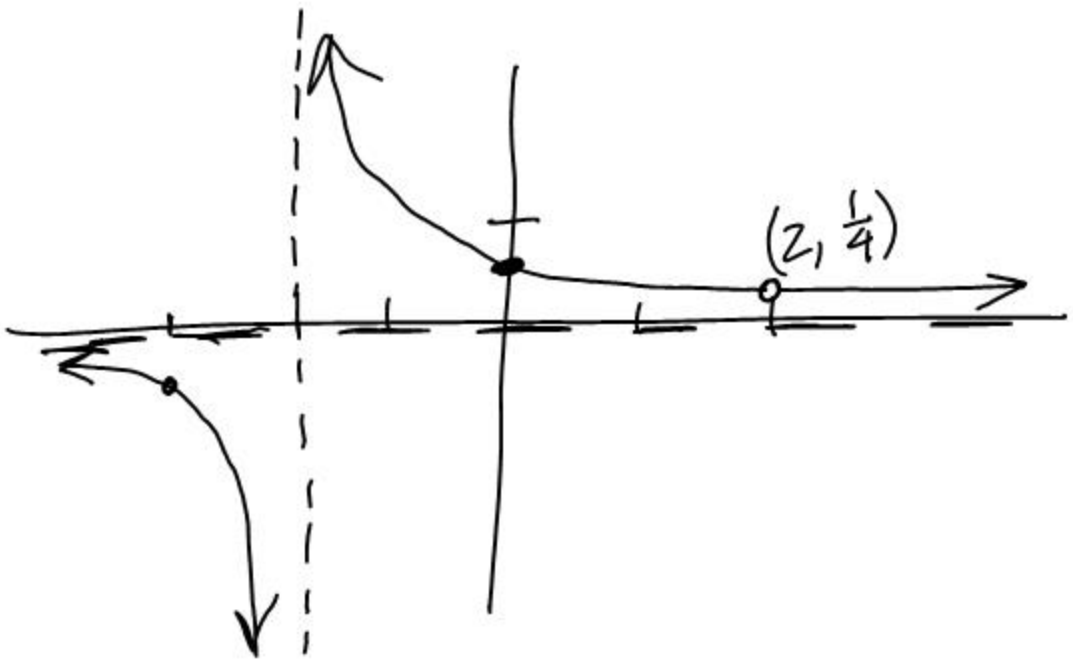


5)

$$y = \frac{x-2}{x^2-4} = \frac{\cancel{(x-2)}\,1}{\cancel{(x-2)}(x+2)}, \quad x \neq 2$$

"hole"

$(2, \frac{1}{4})$



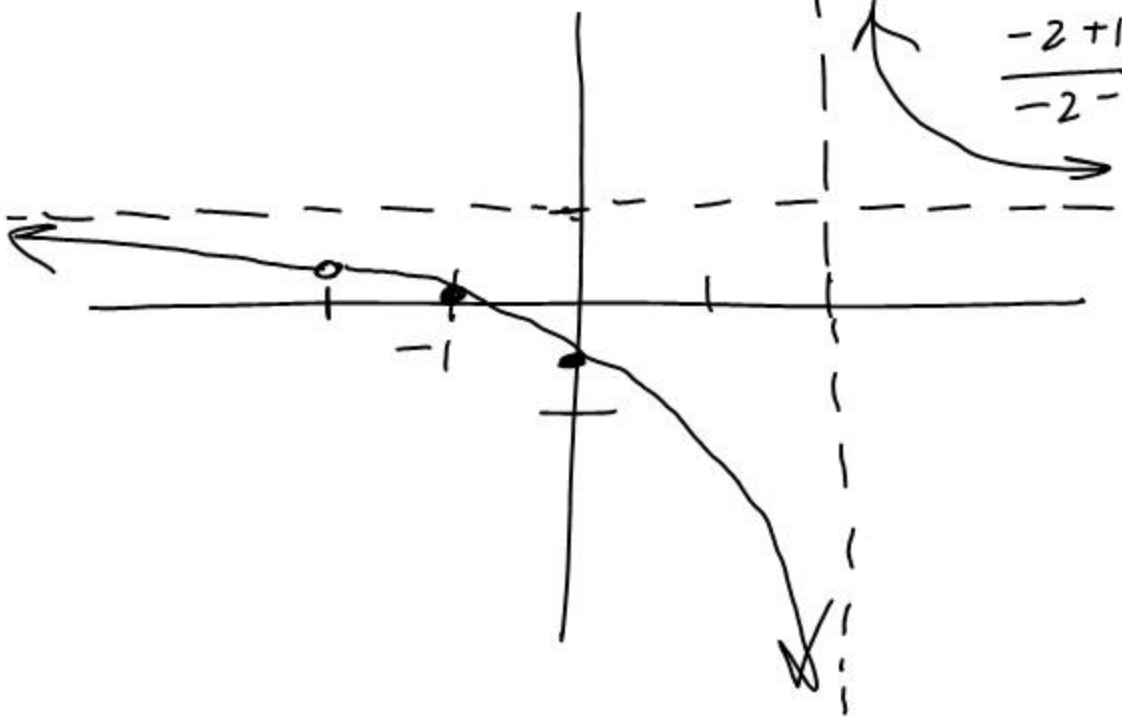
$$y = \frac{x^2+3x+2}{x^2-4} = \frac{\cancel{(x+2)}(x+1)}{\cancel{(x+2)}(x-2)}, \quad x \neq -2$$

"hole"

$(-2, \frac{1}{4})$

$\frac{-2+1}{-2-2}$

$\frac{0+1}{0-2}$



(1) -3

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

(5) $\frac{1}{x+4}$ none

(7) $+2$

(9) 1

(11) $\frac{1}{4}$

(13) none $x^2+1=0$, $x^2=-1$

(15) $x = \pm 1$

(17) $\frac{1}{x-4}$ $x=4$

(19) $y=0$

(21) $y=0$

(23) $y=\frac{1}{2}$

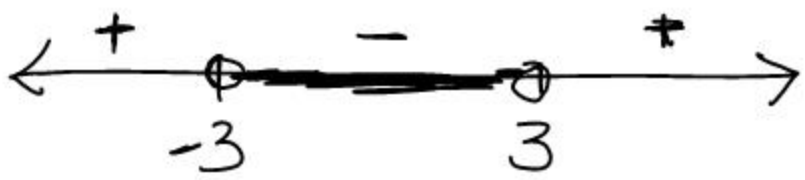
(25) $\frac{1}{x-1}$, $x \neq -1$ $\left(-1, -\frac{1}{2}\right)$

(27) $\frac{x+4\,1}{(x+4)(x+1)}$, $x \neq -4$ $\left(-4, -\frac{1}{3}\right)$

Inequalities

Ex. $x^2 - 9 < 0$

$(x-3)(x+3) < 0$



solution: $(-3, 3)$

$x = -4$

$(-4-3)(-4+3)$

$- \cdot -$

$x = 2$

$(2-3)(2+3)$

$- \cdot +$

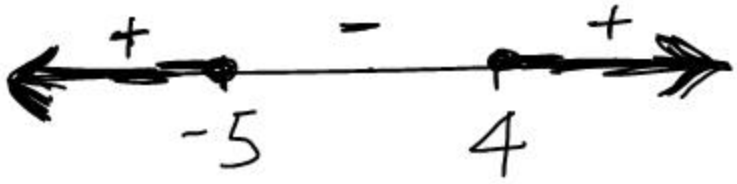
$x = 4$

$(4-3)(4+3)$

$+ \cdot +$

Ex. $x^2 + x - 20 \geq 0$

$(x-4)(x+5) \geq 0$



solution: $(-\infty, -5] \cup [4, \infty)$

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Turn in even on worksheet.