#5g.

$$x+3 \overline{)\, 3x^2 - 1}$$

$3x - 9 + \frac{26}{x+3}$

$-3x^2 \mp 9x$

$-9x - 1$ ← 1st degree

$+9x + 27$

26 ← 0th degree

1st Degree

$y = 3x - 9$

$$2x+1 \overline{)\, 4x^2 + 6x - 3}$$

$2x + 2$

$-4x^2 \mp 2x$

$4x - 3$

$-4x \mp 2$

-5

$$y = \frac{4x^2+6x-3}{2x+1}$$

#5 TEST REVIEW

(a) $f(x) = \dfrac{x+1}{(x+1)(x-1)} = \dfrac{1}{x-1}$, $x \neq -1$ $\qquad \dfrac{1}{-1-1} = \dfrac{1}{-2}$

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

(b) $f(x) = \dfrac{x(x^2-1)}{2x} = \dfrac{x^2-1}{2}$, $x \neq 0$ $\qquad \dfrac{0^2-1}{2} = \dfrac{1}{2}$

"hole" at $(0, \frac{1}{2})$

(c) $f(x) = \dfrac{x-3}{(x-3)(x+2)} = \dfrac{1}{x+2}$, $x \neq 3$ $\qquad \dfrac{1}{3+2} = \dfrac{1}{5}$

"hole" at $(3, \frac{1}{5})$

(d) $f(x) = \dfrac{(x-4)(x+4)}{(x+4)(x+2)} = \dfrac{x-4}{x+2}$, $x \neq -4$ $\qquad \dfrac{-4-4}{-4+2} = \dfrac{-8}{-2} = 4$

"hole" at $(-4, 4)$

(e) $f(x) = \dfrac{x+1}{x^2(x-1) - 1(x-1)} = \dfrac{x+1}{(x-1)(x^2-1)} = \dfrac{x+1}{(x-1)^2(x+1)}$

$f(x) = \dfrac{1}{(x-1)^2}$, $x \neq -1$ $\qquad \dfrac{1}{(-1-1)^2} = \dfrac{1}{4}$

"hole" at $(-1, \frac{1}{4})$

6(f) $\underline{1}$

1	−5	2	8
	1	−4	−2
1	−4	−2	6

$\underline{-1}$

1	−5	2	8
	−1	6	−8
1	−6	8	0

$(x+1)\ (x^2-6x+8)$

$(x+1)\ (x-4)(x-2)$

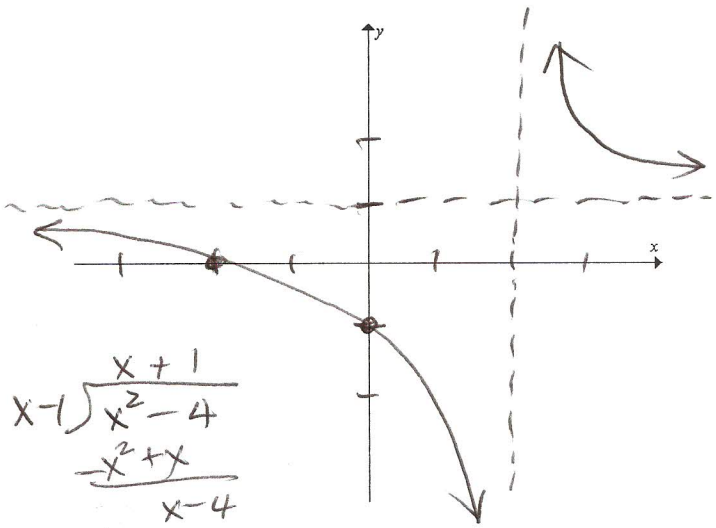
$$f(x) = \frac{(x-4)(x+4)}{(x+1)(x-4)(x-2)} = \frac{x+4}{(x+1)(x-2)},\ x \neq 4$$

"hole" at $(4, 4/5)$

$$\frac{4+4}{(4+1)(4-2)} = \frac{8}{5\cdot 2} = \frac{4}{5}$$

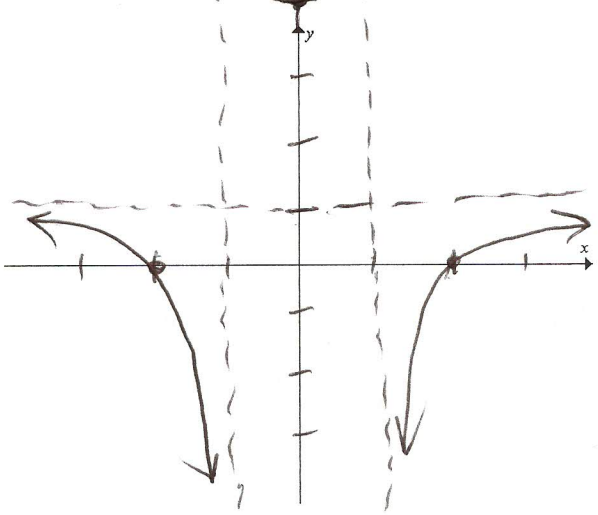
[7] Sketch each function.

[a] $y=\dfrac{x+2}{x-2}$ x-int -2 VA $x=2$ y-int -1 NVA ~~$y=1$~~

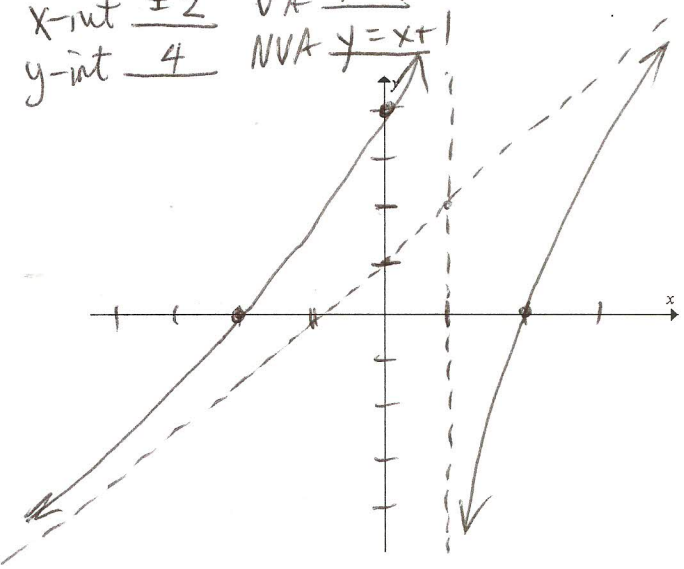


$$x-1\overline{)\,x^2-4}\qquad x+1$$
$$-x^2+x$$
$$x-4$$

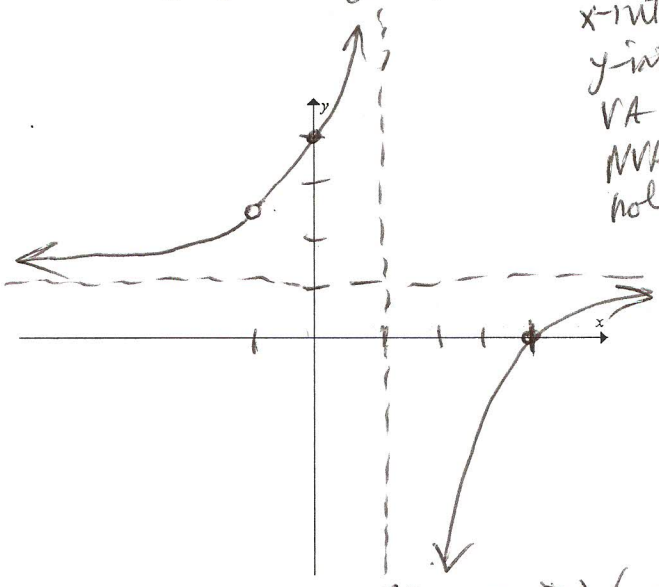
[b] $y=\dfrac{x^2-4}{x^2-1}=\dfrac{(x-2)(x+2)}{(x-1)(x+1)}$ x-int ± 2 y-int 4 VA $x=\pm 1$ NVA $y=1$



[c] $y=\dfrac{x^2-4}{x-1}$ x-int ± 2 VA $x=1$ y-int 4 NVA $y=x+1$



[d] $y=\dfrac{x^2-3x-4}{x^2-1}=\dfrac{(x-4)(x+1)}{(x-1)(x+1)}$, $x\neq -1$ x-int 4 y-int 4 VA $x=1$ NVA $y=1$ hole $(-1,5/2)$



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

[8] Solve each inequality and express the solution in interval notation.

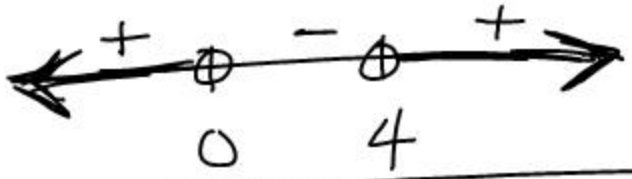
[a] $x^2-25\le 0$ [b] $x^2-4x>0$ [c] $2x^2-7x-4\ge 0$ [d] $2x^3-x^2-3x<0$

[e] $\dfrac{x^2-9}{x+2}\le 0$ [f] $\dfrac{x^2-4x}{x+5}>0$ [g] $\dfrac{2x^2-7x-4}{x^2+3x+2}\ge 0$ [h] $\dfrac{(x-2)(x-3)(x+4)}{(x+1)(x-4)(x+5)}<0$

(9) (a) $(x-5)(x+5) \leq 0$

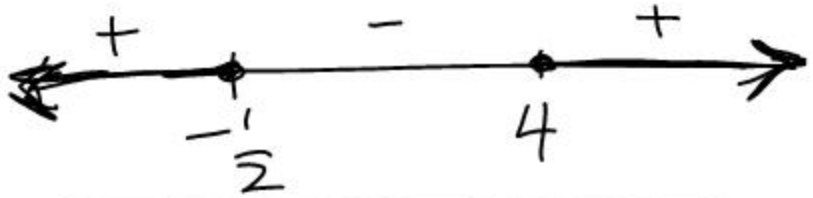
$$[-5, 5]$$

(b) $x(x-4) > 0$



$$(-\infty, 0) \cup (4, \infty)$$

(c) $(2x+1)(x-4) \geq 0$



$$(-\infty, -\tfrac{1}{2}] \cup [4, \infty)$$

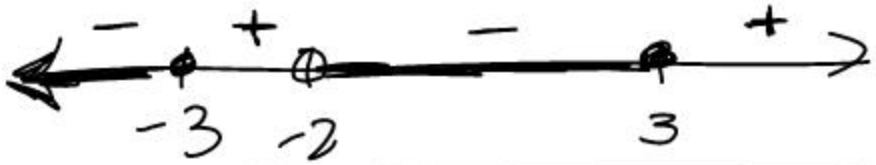
(d) $x(2x^2 - x - 3) < 0$

$x(2x-3)(x+1) < 0$

over

$$(-\infty, -1) \cup (0, 3/2)$$

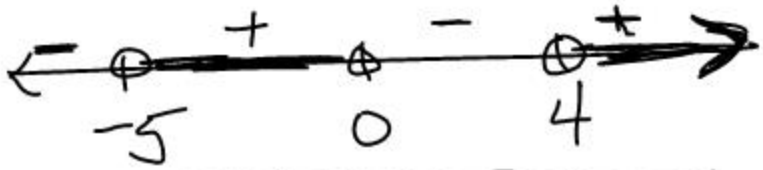
6g $$\frac{(x+3)(x-3)}{x+2} \leq 0$$



Note: $x = -2$ makes the expression undefined

$$(-\infty, -3] \cup (-2, 3]$$

(f) $$\frac{(x)(x-4)}{x+5} > 0$$



$$(-5, 0) \cup (4, \infty)$$

(g) $$\frac{(2x+1)(x-4)}{(x+2)(x+1)} \geq 0$$

$$(-\infty, -2) \cup (-1, -\tfrac{1}{2}] \cup [4, \infty)$$

(8b) $\dfrac{(x-2)(x-3)(x+4)}{(x+1)(x-4)(x+5)} < 0$

$(-5,-4) \cup (-1,2) \cup (3,4)$