BOARD NOTES

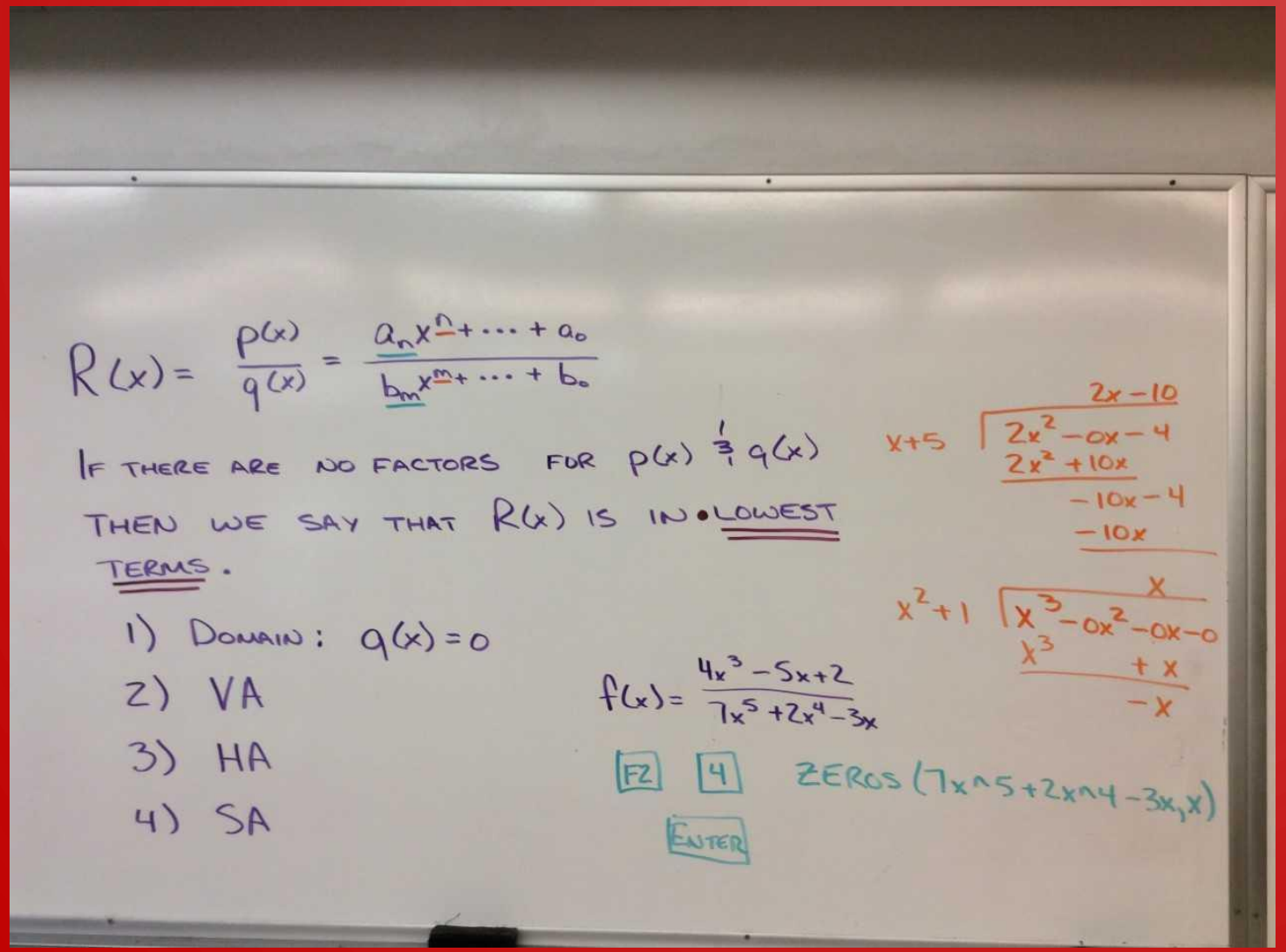
9 OCTOBER 2018

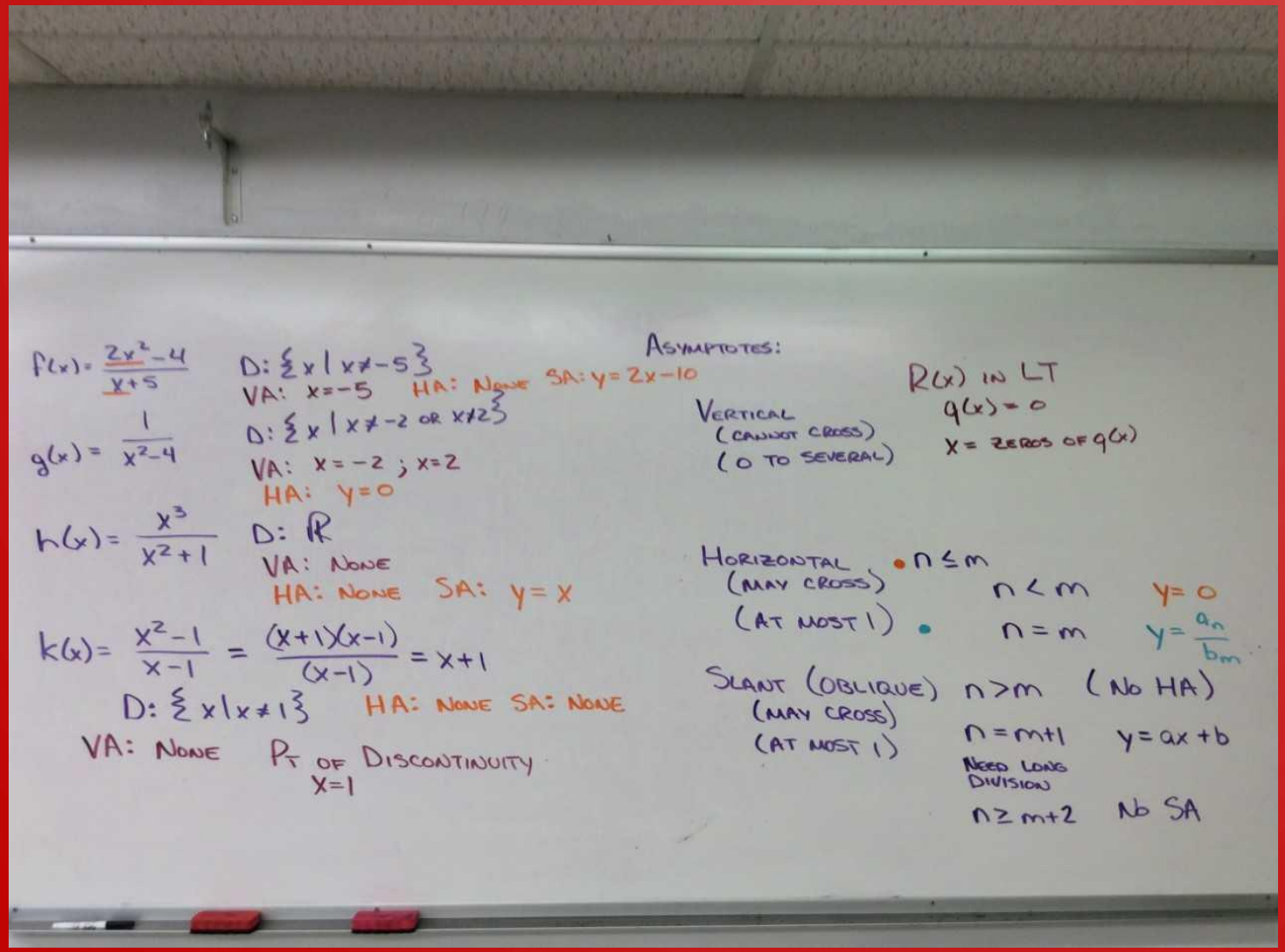
CC PRECALCULUS CHAPTER 4 – POLYNOMIAL AND RATIONAL FUNCTIONS

- SECTION 4.2 - PROPERTIES OF RATIONAL FUNCTIONS

Objectives:

- Find the domain of a rational function
- Find the vertical asymptotes of a rational function
- Find the horizontal or oblique (slant) asymptote of a rational function


$R(x) = \frac{p(x)}{q(x)} = \frac{a_n x^n + \cdots + a_0}{b_m x^m + \cdots + b_0}$
IF THERE ARE NO FACTORS FOR $p(x)$ & $q(x)$ THEN WE SAY THAT $R(x)$ IS IN LOWEST TERMS.
1) DOMAIN: $q(x) = 0$
2) VA
3) HA
4) SA
$f(x) = \frac{4x^3 - 5x + 2}{7x^5 + 2x^4 - 3x}$
F2 4 ZEROS(7x^5+2x^4-3x,x)
ENTER
$x+5$ | $2x^2 - 0x - 4$
$2x^2 + 10x$
$-10x - 4$
$-10x$
2x - 10
x^2+1 | $x^3 - 0x^2 - 0x - 0$
x^3
$+x$
$-x$
x


$f(x) = \frac{2x^2-4}{x+5}$
D: $\{x \mid x \neq -5\}$
VA: $x=-5$ HA: None SA: $y=2x-10$
$g(x) = \frac{1}{x^2-4}$
D: $\{x \mid x \neq -2 \text{ or } x \neq 2\}$
VA: $x=-2$; $x=2$
HA: $y=0$
$h(x) = \frac{x^3}{x^2+1}$
D: $\mathbb{R}$
VA: None
HA: None SA: $y=x$
$k(x) = \frac{x^2-1}{x-1} = \frac{(x+1)(x-1)}{(x-1)} = x+1$
D: $\{x \mid x \neq 1\}$ HA: None SA: None
VA: None Pt of Discontinuity $x=1$
Asymptotes:
Vertical (cannot cross) (0 to several)
R(x) in LT
$q(x) = 0$
x = zeros of $q(x)$
Horizontal (may cross) (at most 1)
$n \leq m$
$n < m$ $y=0$
$n = m$ $y = \frac{a_n}{b_m}$
Slant (oblique) (may cross) (at most 1)
$n > m$ (No HA)
$n = m+1$ $y = ax+b$
Need long division
$n \geq m+2$ No SA