BOARD NOTES

22 OCTOBER 2019

BORGER INDEPENDENT SCHOOL DISTRICT

1926

2A.2 (B) graph and write the inverse of a function using notation such as $f^{-1}(x)$;

2A.2 (C) describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range;

2A.2 (D) use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.

2A.5 (C) rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations;

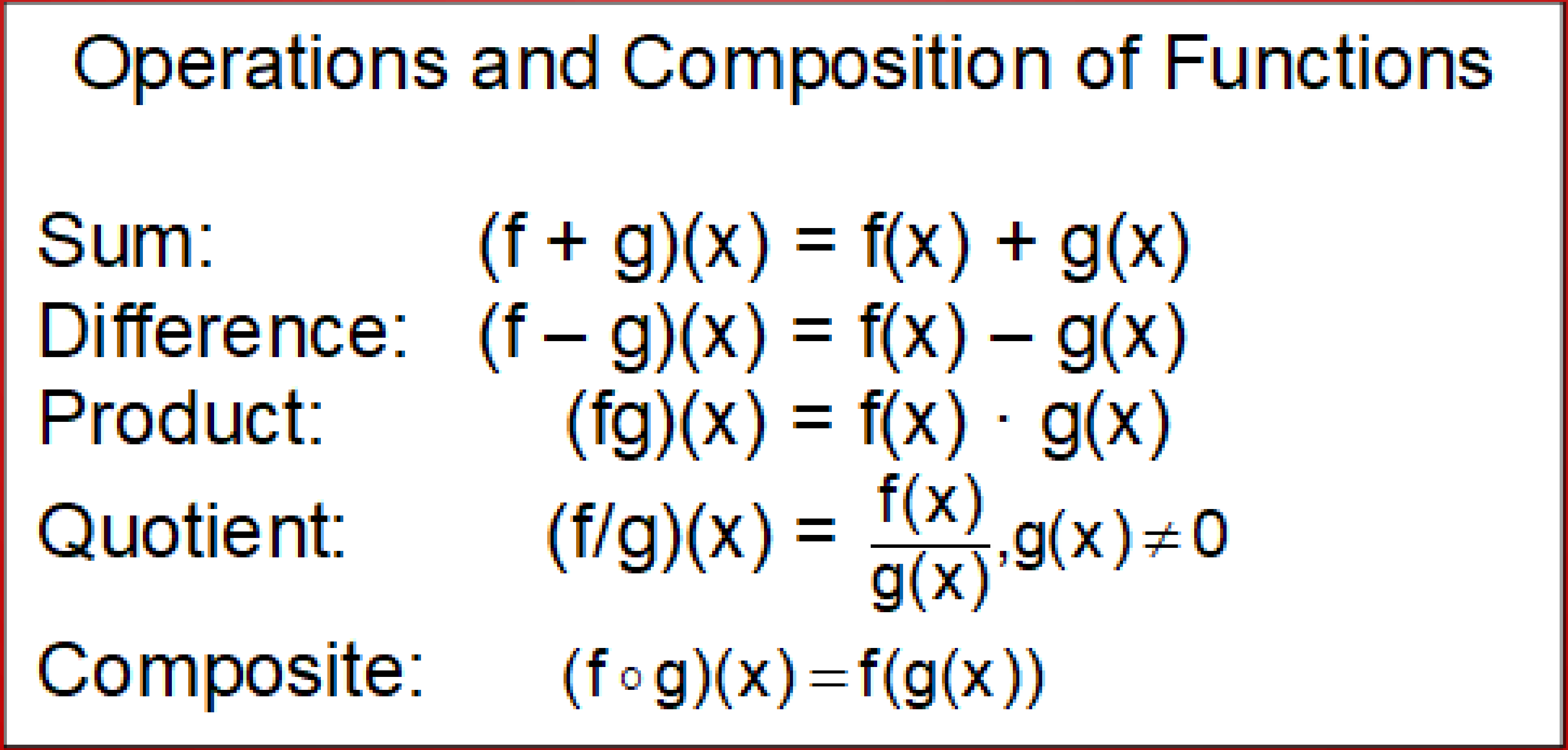
We will be able to use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.

WHAT WE NEED:

- TI – 84
- VLT
- HLT

I WILL BE ABLE TO COMPLETE MY HOMEWORK GIVEN THE

- Equations



Operations and Composition of Functions

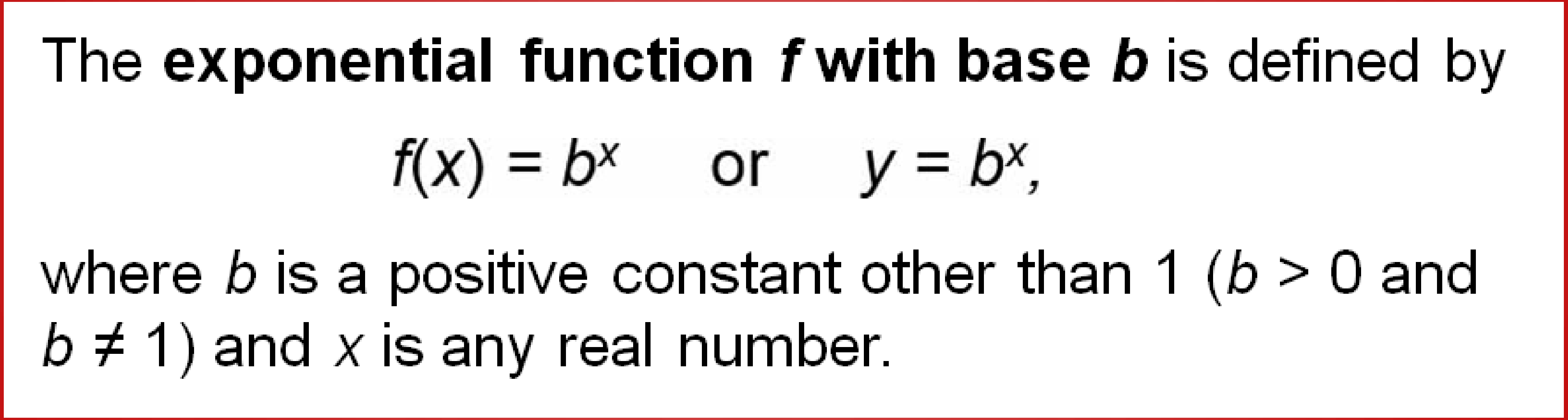
Sum: $(f + g)(x) = f(x) + g(x)$

Difference: $(f - g)(x) = f(x) - g(x)$

Product: $(fg)(x) = f(x) \cdot g(x)$

Quotient: $(f/g)(x) = \dfrac{f(x)}{g(x)}, g(x) \neq 0$

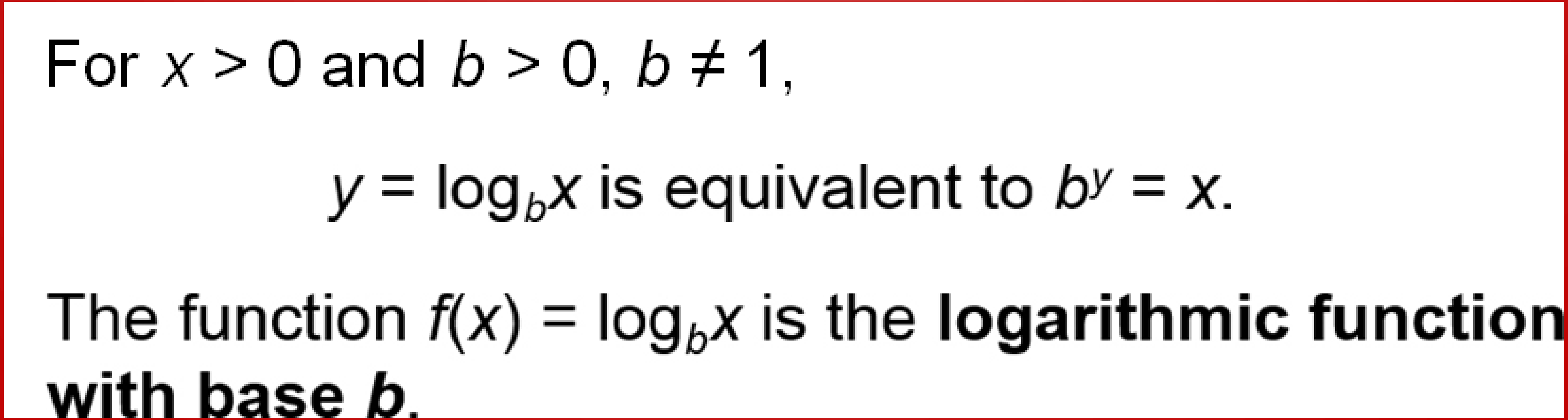
Composite: $(f \circ g)(x) = f(g(x))$



The **exponential function *f* with base *b*** is defined by

$$f(x) = b^x \quad \text{or} \quad y = b^x,$$

where b is a positive constant other than 1 ($b > 0$ and $b \neq 1$) and x is any real number.



For $x > 0$ and $b > 0$, $b \neq 1$,

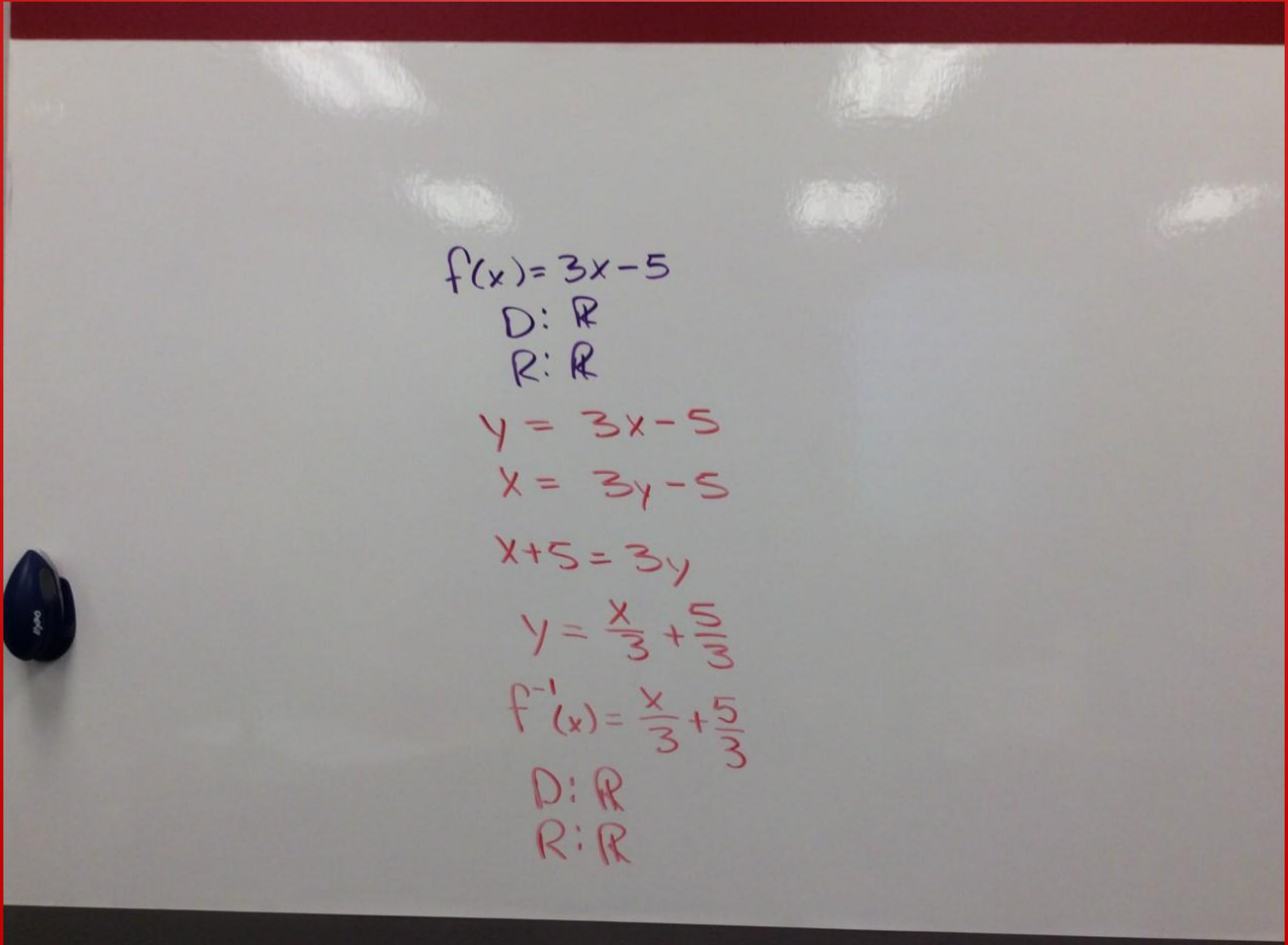
$$y = \log_b x \text{ is equivalent to } b^y = x.$$

The function $f(x) = \log_b x$ is the **logarithmic function with base *b*.**

The equation of the inverse of an exponential function can be written as the logarithmic function of the same base.

Conversely, the inverse of a logarithmic function is the exponential function of the same base.

They are inverses of each other.



$f(x)=3x-5$

D: $\mathbb{R}$

R: $\mathbb{R}$

$y=3x-5$

$x=3y-5$

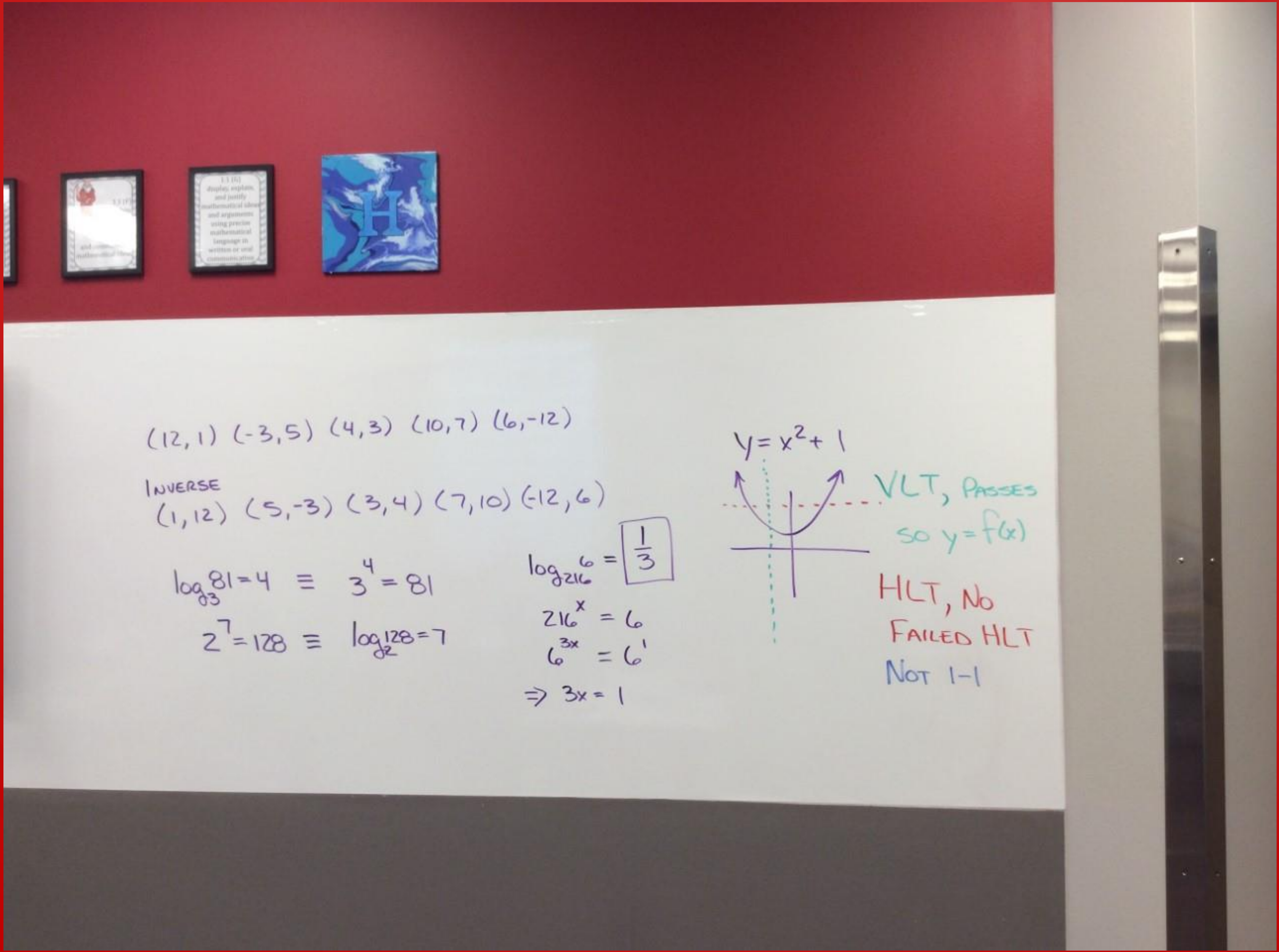
$x+5=3y$

$y=\frac{x}{3}+\frac{5}{3}$

$f^{-1}(x)=\frac{x}{3}+\frac{5}{3}$

D: $\mathbb{R}$

R: $\mathbb{R}$



(12,1) (-3,5) (4,3) (10,7) (6,-12)

INVERSE

(1,12) (5,-3) (3,4) (7,10) (-12,6)

$\log_3 81 = 4 \equiv 3^4 = 81$

$2^7 = 128 \equiv \log_2 128 = 7$

$\log_{216} 6 = \boxed{\frac{1}{3}}$

$216^x = 6$

$6^{3x} = 6^1$

$\Rightarrow 3x = 1$

$y = x^2 + 1$

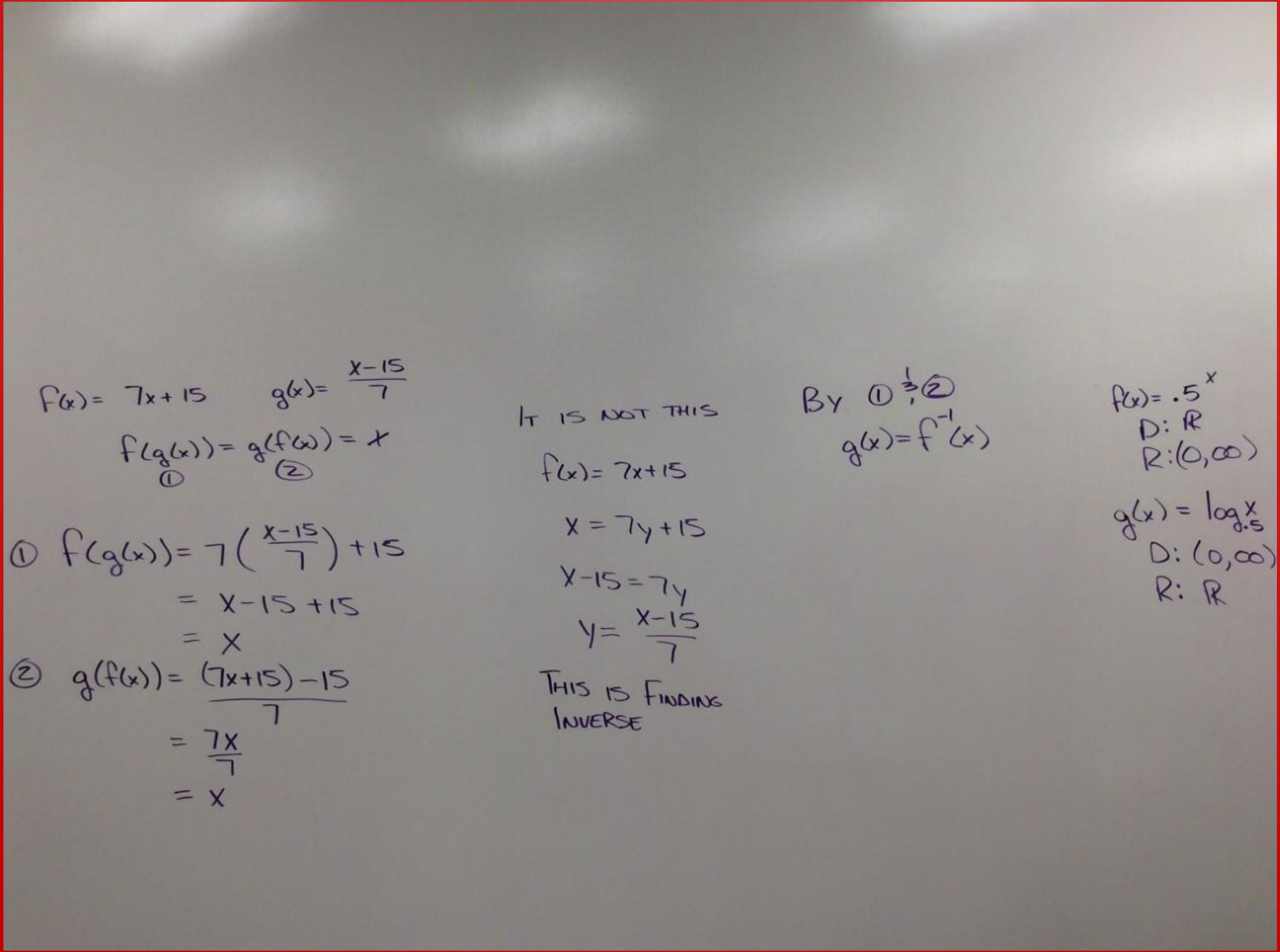
VLT, PASSES

so $y = f(x)$

HLT, NO

FAILED HLT

NOT 1-1



$f(x) = 7x + 15$ $g(x) = \frac{x-15}{7}$

$\underset{①}{f(g(x))} = \underset{②}{g(f(x))} = x$

① $f(g(x)) = 7\left(\frac{x-15}{7}\right) + 15$

$= x - 15 + 15$

$= x$

② $g(f(x)) = \frac{(7x+15)-15}{7}$

$= \frac{7x}{7}$

$= x$

IT IS NOT THIS

$f(x) = 7x+15$

$x = 7y + 15$

$x - 15 = 7y$

$y = \frac{x-15}{7}$

THIS IS FINDING INVERSE

By ① & ②

$g(x) = f^{-1}(x)$

$f(x) = .5^{x}$

D: $\mathbb{R}$

R: $(0, \infty)$

$g(x) = \log_{.5} x$

D: $(0, \infty)$

R: $\mathbb{R}$