Sets and Logic
MHF3202 2787

Prereq-T

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T1: Show no work. *NOTE*: The **inverse-fnc** of g, often written as g^{-1}, is *different* from the **reciprocal fnc** $1/g$. E.g, suppose g is invertible with $g(-2) = 3$ and $g(3) = 8$: Then $g^{-1}(3) = -2$, yet $[1/g](3) \stackrel{\text{def}}{=} 1/g(3) = 1/8$.

Write **DNE** in a blank if the described object does not exist or if the indicated operation cannot be performed.

a $\left[\sqrt{2}^{\sqrt{27}}\right]^{\sqrt{3}} =$ _____ . $\log_8(4) =$ _____ .

b Line $y = [M \cdot x] + B$ owns points $(3, -1)$ and $(-3, 17)$. Hence $M =$ _____ and $B =$ _____ .

c Quadratic $15x^2 + 23x + 6 = [Ax - \alpha] \cdot [Bx - \beta]$, for numbers $A =$ _____ , $\alpha =$ _____ ; $B =$ _____ , $\beta =$ _____ .

d Below, f and g are differentiable fncs with

$$f(2) = 3, \quad f(3) = 5, \quad f'(2) = 19, \quad f'(3) = 17,$$
$$g(2) = 11, \quad g(3) = 13, \quad g'(2) = \tfrac{1}{2}, \quad g'(3) = 7,$$
$$f(5) = 43, \quad g(5) = 23, \quad f'(5) = 41, \quad g'(5) = 29\,.$$

Define the composition $C := g \circ f$. Then $C(2) =$ _____ ; $C'(2) =$ _____ .

Please write each answer as a product of numbers; **do not** multiply out. [*Hint:* The Chain rule.]

e Let $y = f(x) := [7 + \sqrt[3]{2x}]/5$. Its inverse-function is $f^{-1}(y) =$ _____ .

f Let $g(x) := x^3 + x$. Then $g^{-1}(10) =$ _____ and $[g^{-1}]'(10) =$ _____ .

g Compute the sum of this geometric series: $\sum_{k=5}^{\infty} [-1]^k \cdot [1/3]^{2k} =$ _____ .

h $\sum_{n=1}^{\infty} r^n = 2011$. So $r =$ _____ or **DNE**.

[*Hint:* The sum starts with n at **one**, not zero.]

T2: Math-Greek alphabet: Please write the **two** missing data of lowercase/uppercase/name. Eg:

"iota: α: B: ." You fill in: ι I A *alpha* β *beta*.

Γ: Δ: Υ:

ν: ζ: μ:

sigma xi omega lambda

End of Prereq-T

T1:	___ ___ ___	160pts
T2:	___ ___	20pts
Total:	___ ___ ___	180pts

Please PRINT your Name

_____

HONOR CODE: *"I have neither requested nor received help on this exam other than from my professor."*

Signature: _____