

V1: 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 $[1/g](3) \stackrel{\text{def}}{=} 1/g(3) = 1/8$.

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

Total: _____ 160pts

Please PRINT your Name

a $[\sqrt{5}\sqrt{8}]^{\sqrt{2}} = \underline{\hspace{2cm}}$. $\log_{16}(8) = \underline{\hspace{2cm}}$.

b Line $y = Mx + B$ is orthogonal to $y = \frac{1}{5}x + 2$ and owns $(4, 10)$. So $M = \underline{\hspace{2cm}}$ and $B = \underline{\hspace{2cm}}$.

c Quadratic $6x^2 + 29x + 35 = [Ax - \alpha] \cdot [Bx - \beta]$, for numbers $A = \underline{\hspace{2cm}}$, $\alpha = \underline{\hspace{2cm}}$; $B = \underline{\hspace{2cm}}$, $\beta = \underline{\hspace{2cm}}$.

d Below, f and g are differentiable fncs with

$$\begin{aligned} f(2) &= 3, & f(3) &= 5, & f'(2) &= 19, & f'(3) &= 17, \\ g(2) &= 11, & g(3) &= 13, & g'(2) &= \frac{1}{2}, & g'(3) &= 7, \\ f(5) &= 43, & g(5) &= 23, & f'(5) &= 41, & g'(5) &= 29. \end{aligned}$$

Define the composition $C := g \circ f$. Then $C(2) = \underline{\hspace{2cm}}$; $C'(2) = \underline{\hspace{2cm}}$.

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 $f^{-1}(y) = \underline{\hspace{2cm}}$.

f Let $g(x) := x^3 + 2x - 5$. Then $g^{-1}(7) = \underline{\hspace{2cm}}$ and $[g^{-1}]'(7) = \underline{\hspace{2cm}}$.

g For natural number N , the sum $\sum_{k=18}^{18+N} 4^k$ equals $\underline{\hspace{2cm}}$.

h Marty the martian has 3 feet. In his sock drawer, he has 50 red socks, 50 blue socks and 50 green socks; 150 socks total, loose, jumbled. The minimum number of (individual) socks he need take, to guarantee a matched set of 3 socks, is $\underline{\hspace{2cm}}$.

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

Signature: