

12. Given the table below, find $G'(3)$ if $G(x) = g(g(x))$.

10 pts

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	3	2	4	6
2	1	8	5	7
3	7	2	7	9

$$G'(x) = g'(g(x)) \cdot g'(x)$$

$$G'(3) = g'(g(3)) \cdot g'(3)$$

$$= g'(2) \cdot 9$$

$$= 7 \cdot 9$$

$$= 63$$

13. Extra Credit: Find dy/dx by implicit differentiation if $y \sin(x^2) = x \sin(y^2)$.

$$y \frac{d}{dx} \sin(x^2) + \sin(x^2) \frac{dy}{dx} = x \cdot \frac{d}{dx} \sin(y^2) +$$

5 pts

$$y \cdot \cos(x^2) \cdot 2x + \sin(x^2) y' = x \cdot \cos(y^2) \cdot 2y \cdot y' + \sin(y^2)$$

$$\sin(x^2) y' - 2xy \cos(y^2) y' = -2xy \cos(x^2) + \sin(y^2)$$

$$y' [\sin(x^2) - 2xy \cos(y^2)] = -2xy \cos(x^2) + \sin(y^2)$$

$$y' = \frac{-2xy \cos(x^2) + \sin(y^2)}{\sin(x^2) - 2xy \cos(y^2)}$$