AP Calculus AB Mr. Shubleka Quiz: 17

Present neatly ~~on separate paper~~. Justify for full credit. No Calculators.

Name Key / SHUBLEKA. Score ______ 10 minutes

1.

Find an equation of the tangent line to the curve $y = \tan(\pi x^2/4)$ at the point $(1, 1)$.

2.

Let $r(x) = f(g(h(x)))$, where $h(1) = 2, g(2) = 3, h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$. Find $r'(1)$.

3.

If $h(x) = \sqrt{4 + 3f(x)}$, where $f(1) = 7$ and $f'(1) = 4$, find $h'(1)$.

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1. $\frac{dy}{dx} = \sec^2\left(\frac{\pi x^2}{4}\right) \cdot \frac{2\pi x}{4}$ @ $x = 1$ $\frac{dy}{dx} = \frac{\pi}{2} \cdot \sec^2\left(\frac{\pi}{4}\right)$

$= \frac{\pi}{2} \frac{1}{\cos^2(45^\circ)} =$

$y - 1 = \pi(x - 1$

$= \frac{\pi}{2} \cdot \frac{1}{\left(\frac{\sqrt{2}}{2}\right)^2} = \pi.$

2. $r'(x) = f'(g(h(x))) \cdot g'(h(x)) \cdot h'(x)$

$r'(1) = f'(g(h(1))) \cdot g'(h(1)) \cdot h'(1)$

$= f'(g(2)) \cdot g'(2) \cdot 4 = f'(3) \cdot 5 \cdot 4$

$= 6 \cdot 5 \cdot 4 = 6 \cdot 20 = 120$

3. $h(x) = (4 + 3f(x))^{1/2} \Rightarrow h'(x) = \frac{1}{2}(4 + 3f(x))^{-1/2} \cdot (3f'(x))$

$h'(1) = \frac{1}{2}(4 + 3f(1))^{-1/2} \cdot 3 \cdot f'(1) =$

$= \frac{1}{2}(4 + 3 \cdot 7)^{-1/2} \cdot 3 \cdot 4 =$

$= \frac{1}{2} \frac{1}{25^{1/2}} \cdot 12 = \frac{6}{5}$