AP Calculus AB   Mr. Shubleka   Quiz: 20

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

Name KEY/SHUBLEKA   Score ______   10 minutes

1.

Find all points on the curve $x^2y^2 + xy = 2$ where the slope of the tangent line is -1.

2.

. If $f(x) + x^2[f(x)]^3 = 10$ and $f(1) = 2$, find $f'(1)$.

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① $\frac{d}{dx}(x^2y^2 + xy) = \frac{d}{dx}(2)$

$2xy^2 + x^2 2y\frac{dy}{dx} + y + x\cdot\frac{dy}{dx} = 0$

$\frac{dy}{dx}\left[2yx^2 + x\right] = -2xy^2 - y$

$\frac{dy}{dx}(2yx+1)\cdot x = -y(2yx+1)$

$\left.\begin{array}{l}\frac{dy}{dx} = -\frac{y}{x} \\ \frac{dy}{dx} = -1\end{array}\right\} \Rightarrow \boxed{y = x}$ → plug into the equation of the curve.

As long as $2yx+1 \neq 0$

$x^4 + x^2 - 2 = 0$

$\underbrace{(x^2+2)}_{\neq 0}(x^2-1) = 0$

$(x-1)(x+1) = 0$

$x = \pm 1,\ y = \pm 1$

$(1, 1), (-1, -1)$

② $f'(x) + 2x(f(x))^3 + x^2\cdot 3[f(x)]^2\cdot f'(x) = 0$

$f'(1) + 2\cdot 1\cdot(f(1))^3 + 1^2\cdot 3[f(1)]^2\cdot f'(1) = 0$

$13 f'(1) = -16$

$\boxed{f'(1) = -\frac{16}{3}}$