Present neatly. Justify for full credit. No Calculators.

Name SHUBLEKA/KEY Score _____ ~10 minutes / A

Find equations to the tangent line and normal line to the curve at the given point.

$y = \sqrt{1 + 4\sin x}, \quad (0, 1)$

$$\left.\frac{dy}{dx}\right|_{x=0} = \frac{1}{2}(1+4\sin x)^{-1/2} \cdot (4\cos x)\Big|_{x=0} = \frac{1}{2}(1+0)^{-1/2} \cdot 4 \cdot \cos 0 = 2$$

tangent: $y - 1 = 2(x-0)$ $y = 2x+1$

normal: $y - 1 = -\frac{1}{2}(x-0)$ $y = -\frac{1}{2}x + 1$.

Present neatly. Justify for full credit. No Calculators.

Name SHUBLEKA / KEY Score _____ ~10 minutes / F

Find equations to the tangent line and normal line to the curve at the given point.

$x^2 + 4xy + y^2 = 13, \quad (2, 1)$

$\frac{d}{dx}\left(x^2+4xy+y^2\right) = \frac{d}{dx}(13)$

$2x + 4y + 4x\frac{dy}{dx} + 2y\cdot\frac{dy}{dx} = 0$

@ $x=2$, $y=1$: $2\cdot 2 + 4\cdot 1 + 4\cdot 2\cdot\frac{dy}{dx} + 2\cdot 1\cdot\frac{dy}{dx} = 0$

$10\frac{dy}{dx} = -8$

$\frac{dy}{dx} = \frac{-8}{10} = \frac{-4}{5}$

tangent: $y - 1 = \frac{-4}{5}(x-2) \iff y = \frac{-4}{5}x + \frac{13}{5}$

normal: $y - 1 = \frac{5}{4}(x-2) \iff y = \frac{5}{4}x - \frac{3}{2}$