Study Guide: 3.8 – 3.11

Name:

Given the relation: $e^{xy} = x^2 + y^2$

Find the equation of the tangent line to the curve at the point (2, 0.75).

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

$e^{1.5}(2y' + 0.75) = 4 + 1.5y'$

$4.482(2y' + 0.75) = 4 + 1.5y'$ $\quad 8.963y' + 3.361 = 4 + 1.5y'$

$-0.639 = -7.463y'$ $\quad y' = 0.0856$

answer: $y - 0.75 = 0.0856(x - 2)$

Calculate g(b) and $g'(b)$, where g(x) = $f^{-1}(x)$.

f(x) = $2^x + 3^x$ $\quad$ b = 13

$2^x + 3^x = 13$ $\quad x = 2$ $\quad f(2) = 13$ $\quad g(13) = 2$

$g'(13) = \frac{1}{f'(2)}$ $\quad f'(x) = 2^x \ln 2 + 3^x \ln 3$ $\quad f'(2) = 4\ln 2 + 9\ln 3$

$g'(13) = \frac{1}{4\ln 2 + 9\ln 3}$

g(b) = 2

$g'(b)$ = $\frac{1}{4\ln 2 + 9\ln 3}$

Find $\frac{dy}{dx}$ at x = 2 if y = $\sec^{-1} 5x$ $\quad \frac{dy}{dx} = \frac{1}{|5x|\sqrt{25x^2 - 1}} \cdot 5 = \frac{1}{|x|\sqrt{25x^2 - 1}}$

$= \frac{1}{2\sqrt{99}}$

$\frac{dy}{dx}$ = _____