Homework 8

§3.7#5, 17, 21, 27, 35*(*a* and *d*), 39, **16**, **26**

§3.8#5, 8, 23, §3.9#17, 39, **14a***

§3.7 #5. Find $\frac{dy}{dx}$ if $xy + x + y = 5$

§3.7 #17. Find $\frac{dy}{dx}$ if $\arctan(x^2y) = xy^2$

§3.7 #21. Find $\frac{dy}{dx}$ if $\sin(ay) + \cos(bx) = xy$ where a and b are constants

§3.7 #27. Find the equation of the line tangent to $\ln(xy) = 2x$ at the point $(1, e^2)$

§3.7 #35*a,d. a) If $3x^2 + y^2 - xy = 5$, find $\frac{dy}{dx}$

d) Find all points where the tangent line to $3x^2 + y^2 - xy = 5$ is horizontal or vertical.

§3.7 #39. If $y = \arcsin(x)$ then $x = \sin(y)$. Use implicit differentiation on $x = \sin(y)$ to show that

$$\frac{d}{dx} \arcsin(x) = \frac{1}{\sqrt{1 - x^2}}$$

§3.7 #**16**. Find $\frac{dy}{dx}$ if $e^{\cos(y)} = x^3 \arctan(y)$.

§3.7 #**26**. Find the equation of the line tangent to the curve $xy^2 = 1$ at the point $(1, -1)$.

§3.8 #5. Find the derivative of $f(t) = t^3 \sinh(t)$

§3.8 #8. Find the derivative of $f(t) = \cosh(e^{t^2})$

§3.8 #23. Find the limit as $x \to \infty$ of $\frac{\sinh(2x)}{\cosh(3x)}$

§3.9 #17. The equation $x + \ln(1 + x) = 0.2$ has a solution near $x = 0$. By replacing the left side of the equation by its linearization, find an approximate value for the solution.

§3.9 #39. a) Show that $1 - x$ is the local linearization of $\frac{1}{1+x}$ near $x = 0$

b)From you answer to part a), show that near $x = 0$, $\frac{1}{1+x^2} \approx 1 - x^2$

c)Without differentiating $\frac{1}{1+x^2}$, what do you think its derivative is at $x = 0$

§3.9 #**14a***. a) Find the local linearization of $(1 + x)^k$ near $x = 0$.