MATH 104 TUTORIAL 5 ANSWERS

1.a. $y = 2x + 7 = f^{-1}(x);$

Domain and Range of f^{-1}: all reals

b. $y = \frac{1}{x^{1/3}} = \sqrt[3]{\frac{1}{x}} = f^{-1}(x)$

Domain of f^{-1}: $x \neq 0$, Range of f^{-1}: $y \neq 0$;

2. $1/9$

3.a $\frac{1}{x(1+\ln x)^2}$ **b.** $\frac{1}{1-x^2}$

4.a $\ln \frac{1}{3}$ **b.** $\frac{1}{\ln 4}$

5.a $y' = \left(\frac{2}{\sqrt{x}} + 2x\right) e^{(4\sqrt{x}+x^2)}$ **b.** xe^x

c. $2e^{\theta}\cos\theta$ **d.** $2\theta e^{-\theta^2}\sin\left(e^{-\theta^2}\right)$ **e.** $(1 - t\sin t)\,e^{\cos t}$

6.a 1 **b.** $e^{(2x-1)} + C$ **c.** $-e^{1/x} + C$

7.a $y' = (x+1)^x\left[\frac{x}{x+1} + \ln(x+1)\right]$

b. $y' = \left(\frac{\ln(\ln x)+1}{x}\right)(\ln x)^{\ln x}$