MATH 21A, practice problems for Midterm 2
Answer key

1.a) $\frac{\cos(x)\ln(x) - \sin(x)/x}{\ln^2(x)}$

b) $(1 - x\sin x)e^{\cos x}$

c) $-\frac{e^{\ln(2+x) - \ln(1+x)}}{(1+x)(2+x)}$.

d) $\frac{4}{3}x^{1/3} + \frac{1}{3}x^{-2/3}$

e) $\left(\frac{\sqrt{x+1}}{\sqrt{x-1}}\right) \cdot \frac{1}{(1+x)^2}$.

f) $2x\arctan(x) + 1$

2. a) $y' = -3x/2y$

b) $y' = -\sin(x)/\sin(y)$

c) $y' = y/x$

3. $y = 3e^{-1}x - 2e^{-1}$

4. $f'(x) = 1 + \cos(x) \geq 0$, so $f(x)$ is increasing everywhere.

5. $m(t) = 50e^{-\frac{\ln 2}{100}t}$.

6. (a) 80 (b) 20 (c) $T'(x) = -180e^{-3x}$, decreasing.

7. $\sqrt[3]{8.1} = (8.1)^{1/3} \approx \frac{1}{12} \cdot 0.1 + 2 \approx 2.008$