MATH 220: CALCULUS I
WORKSHEET 4
JANUARY 24, 2013

1. Sketch the graph of $2\sin(x - \frac{\pi}{2}) + 2$.

2. Suppose $0 < \theta < \pi/2$ and $\cos(\theta) = \frac{5}{13}$. Compute $\cos(\frac{\pi}{2} - \theta)$.

3. Find the function $f(x) = ka^x$ such that the points $(1, 2)$ and $(3, 16)$ lie on the graph of f where the domain of f is the entire real line.

4. If $f(x) = 2^x$, show that $\dfrac{f(x+h) - f(x)}{h} = 2^x \left(\dfrac{2^h - 1}{h} \right)$.

5. Determine the exact value for each solution to the equation $\ln(4 - x) + \ln(4 + x) = 0$.

6. A bacterial culture starts with 100 bacteria and quadruples in size every 2 hours.

   (a) Find a formula for the number of bacteria as a function of the number of hours since its population was 100.

   (b) At what time is the population equal to 1000?