Practice Problems - Final: Part 2 (Due Thurs, May 29)

Math 1060Q – Summer 2014

Professor Hohn

1. Write $2^8 \dfrac{4^{77}}{16^{28}}$ as a power of 4.

2. Find the smallest possible positive number x such that $16\sin^4 x - 16\sin^2 x + 3 = 0$.

3. Give an example of an odd function whose domain is the real numbers and whose range is $\{-\pi^2, 0, \pi^2\}$.

4. Let $f(x) = \dfrac{x^4 - 2x^2 - 35}{2x^4 - 8}$. Find the vertical asymptotes and end behavior of $f(x)$. What are the zeros of f?

5. Calculate $\log(\frac{1}{2}) + \log(\frac{2}{3}) + ... + \log(\frac{99}{100})$.

6. Evaluate $\cos(\tan^{-1} 5)$.

7. High tide at La Jolla Cove occurs at 5 am and is 6.5 ft. Low tide occurs at 11 am and is -0.5 ft. A simple model for such tides could be a cosine function of the form $f(x) = a\cos(bx + c) + d$. Determine the values for $a > 0$, b, c, and d for $f(x)$ where x represents the number of hours since midnight. Sketch f(x).

8. Simplify each of the following expressions.

   (a) $\sin^{-1}(\cos(\frac{5\pi}{6}))$

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

9. Solve for x in the following equations.

   (a) $\log_4 x + \log_4(x-3) = 1$

(b) $e^x + 2e^{-x} = 3$

10. Each year the local country club sponsors a tennis tournament. Play starts with 128 participants. During each round, half of the players are eliminated. How many players remain after 5 rounds?

11. Show that $\sin^2(2x) = 4(\sin^2 x - \sin^4 x)$. Hint: Start on the left-hand side and use the double angle identity.

12. Sketch the graph of the function $4\sin(2x+1)+5$ on the interval $[-3\pi, 3\pi]$.

13. Let $f(x) = \dfrac{6x+1}{5x-9}$.

(a) Find the domain of f.

(b) Find the range of f.

(c) Find a formula for f^{-1}.

(d) Find the domain of f^{-1}.

(e) Find the range of f^{-1}.