

Math 273 - Fall 2015

Homework 1

Due August 31, 2015

I must study politics and war that my sons may have liberty to study mathematics and philosophy.

—John Adams

Turn in:

1.2.11 Find an expression for a cubic function f if $f(1) = 6$ and $f(-1) = f(0) = f(2) = 0$.

1.3.27 Some of the highest tides in the world occur in the Bay of Fundy on the Atlantic Coast of Canada. The water depth at low tide is about 2.0 m and at high tide it is about 12.0 m. The natural period of oscillation is 12 hours and on June 30, 2009 high tide occurred at 6:45 AM. Find a function involving the cosine function that models the water depth $D(t)$ (in meters) as a function of time t (in hours after midnight) on that day.

3. Let $f(x) = 2x^2 + 5$ and $g(x) = x - 3$.

- a. What is $f(g(x))$?
- b. What is $g(f(x))$?

4. What is the domain of

$$\frac{\sqrt{x+2} + \sqrt{1-x}}{\sin(\pi x)} \quad ?$$

5. Find the inverse function of

$$f(x) = 2^{1+\sqrt{x^2+1}}$$

- a. when the domain of $f(x)$ is $(0, \infty)$.
- b. when the domain of $f(x)$ is $(-\infty, 0)$.