This first homework assignment is partly about practicing what we've talked about in class but also a way to remind yourself of some of the prerequisite knowledge (aka precalculus) we expect you to know. Sections 1.1 through 1.6 are good resources for this. If you would like a more expansive review (videos and even more examples), Stanford has a precalculus refresher just for that! More information can be found at math19.stanford.edu/restricted/precalculus.html.

Problems from the textbook are denoted as “Section XX, #XX.”

**Problem 1:** Find the domain of each of the following functions.

(a) $\frac{1}{x^2 + 2}$  
(b) $\frac{1}{x^2 - 2}$  
(c) $\sqrt{x^2 - 16}$  
(d) $\ln(x^2 - 16)$  
(e) $\frac{1 + x}{e^{\cos x}}$

**Problem 2:** Section 1.2, #16

**Problem 3:** Section 1.2, #38

**Problem 4:** Section 1.3, #12

**Problem 5:** Section 1.4, #12

**Problem 6:** Section 1.4, #18

**Problem 7:** Section 1.4, #30

**Problem 8:** For each of the following, draw the angle using a ray through the origin, and determine whether the sine, cosine, and tangent of that angle are positive, negative, zero, or undefined.

(a) $2\pi$  
(b) $\frac{3\pi}{2}$  
(c) $-\frac{4\pi}{3}$  
(d) 4

**Problem 9:** Solve the following equations for $0 \leq \theta < 2\pi$.

(a) $2\theta \cos(\theta) + \theta = 0$  
(b) $\cos^2(\theta) = \frac{1}{2}$  
(c) $\tan(\theta) = 1$  
(d) $\sin(3\theta) = \frac{\sqrt{3}}{2}$

*Note: the notation “cos²(θ)” means “(cos(θ))^2.”*

**Problem 10:** Find the point(s) of intersection of the parabola $y = x^2 + 2$ and the line $y = x + 4$.

*Note: you don’t need the quadratic formula for this, though you could use it.*
Problem 11: Find the inverse of the function $f(x) = \frac{2}{x^2 + 1}$ for $x \geq 0$.

Problem 12: Assume that $\log_b(x) = 3$, $\log_b(y) = 2$, and $\log_b(z) = 5$. Evaluate the following expressions.

(a) $\log_b \left( \frac{\sqrt{xyz}}{z} \right)$  
(b) $\log_b \left( \frac{\sqrt{x}}{\sqrt{z}} \right)$  
(c) $\log_b \left( \frac{b^2x^{5/2}}{\sqrt{y}} \right)$

Note: You should feel confident doing the numerical calculations without a calculator.