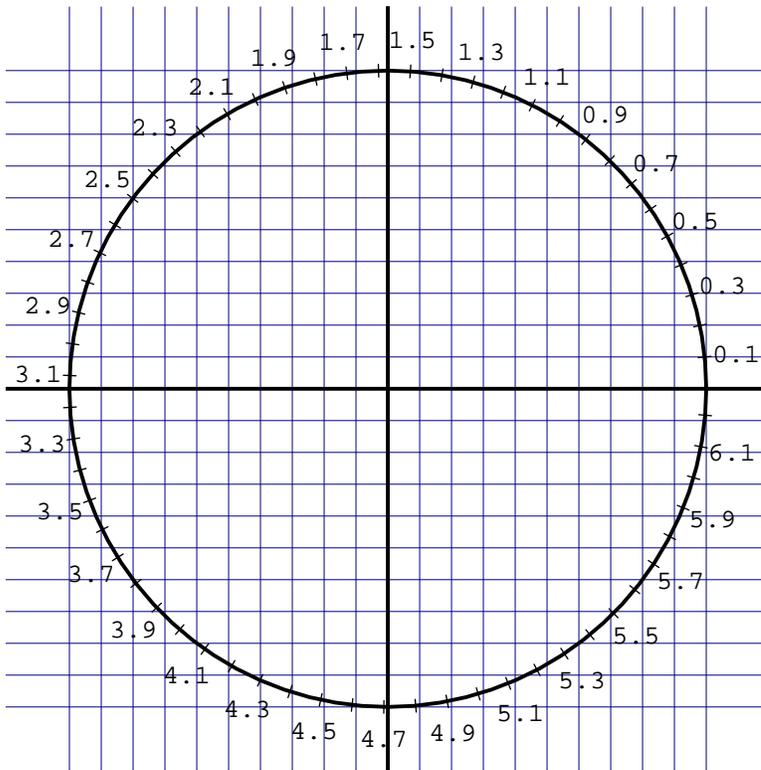**Problem Session: Review of Trigonometry (from Part I of Midterm I)**

1. Use the calibrated unit circle below to evaluate each of the following expressions. Note that each square on the grid below measures 0.1×0.1. Round your answers to the nearest tenth.

   (a) $\sin^{-1} 0.4$

   (b) $\arcsin(-0.4)$

   (c) $\cos^{-1}(-0.4)$

2. (a) Find $\tan\left(\cos^{-1}\left(\frac{-3}{5}\right)\right)$

   (b) Find $\tan^{-1}(-\sqrt{3})$

   (c) If $g(x) = \tan(\cos(3x^3 + x))$, find $g'(x)$

   (d) If $f(x) = (2x + 2)^{x^2+1}$, find $f'(x)$.

3. (a) Find all solutions to the equation $\cos^2(3x) = \frac{1}{2}\cos(3x)$ for $x \in [-\pi, \pi]$

   (b) Find all solutions to the equation $\tan(2x + 1) = 1.2$ for x any real number.

Problem Session: Review of Trigonometry
Solutions

1. (a) ≈ 0.4

   (b) ≈ -0.4

   (c) ≈ 2.0

2. (a) $-\dfrac{4}{3}$

   (b) Find $-\dfrac{\pi}{3}$

   (c) $g'(x) = \sec^2\left(\cos(3x^3 + x)\right)\left(-\sin(3x^3 + x)\right)\left(9x^2 + 1\right)$

   (d) $f'(x) = (2x + 2)^{x^2+1}\left(2x\ln(2x + 2) + (x^2 + 1)\dfrac{1}{x + 1}\right)$

3. (a) $x = -\frac{5\pi}{6}, -\frac{\pi}{2}, -\frac{\pi}{6}, \frac{\pi}{6}, \frac{\pi}{2}$, or $\frac{5\pi}{6}$ or $x = -\frac{7\pi}{9}, -\frac{5\pi}{9}, -\frac{\pi}{9}, \frac{\pi}{9}, \frac{5\pi}{9}$, or $\frac{7\pi}{9}$.

   (b) $x = \frac{\tan^{-1}(1.2) - 1 + k\pi}{2}$ for k any integer (or you could write the answer in two separate pieces as $x = \frac{\tan^{-1}(1.2) - 1 + 2k\pi}{2}$ or $x = \frac{\tan^{-1}(1.2) - 1 + \pi + 2k\pi}{2}$).