**Solutions**

MATH 191, FALL 2009

**QUIZ 1**

Instructions: Write your name at the top. You have ten minutes to complete the following four questions. Show your work as clearly as possible. No calculators, books, or notes are allowed.

1. Find the equation of the line with slope 3 passing through the point (2, 4).

   In point-slope form, the equation is
   \[ y - 4 = 3(x - 2). \]

   In slope-intercept form, this becomes
   \[ y = 3x - 6 + 4 = 3x - 2. \]

2. Graph the equation \( y = \sin(x - \pi/4) \). Make sure your graph shows a full period of the function, and indicate the \( x \)- and \( y \)-coordinates of any maxima, minima, and zeros.

   1. \( y = \sin(x) \)
   2. To graph \( y = \sin(x - \pi/4) \), shift right \( \pi/4 \) units:

3. Finally, \( y = \frac{\sin(x - \pi/4)}{{1/3}} \) is compressed vertically:

3. Say \( 0 < \theta < \pi/2 \) and \( \sec(\theta) = 4 \). Calculate \( \sin(\theta) \). Would your answer change if \( \theta \in (-\pi/2, 0) \)?

   \[ \sec(\theta) = \frac{1}{\cos(\theta)} = 4 \]

   So \( \cos(\theta) = \frac{1}{4} \)

   By the Pythagorean Theorem,
   \[ y^2 + (\frac{1}{4})^2 = 1 \]

   So \( y = \sqrt{1 - (\frac{1}{4})^2} = \sqrt{1 - \frac{16}{16}} = \sqrt{\frac{15}{16}} = \frac{\sqrt{15}}{4} \).

   So \( \sin(\theta) = \frac{\sqrt{15}}{4} \).

   If \( \theta \in (-\pi/2, 0) \), then the picture is: