

# Discussion Problems for Math 180

Thursday, October 2, 2014

*Remember to include units in answers where appropriate!*

1. Have you reviewed trigonometry?
  - (a) Express  $\cos(\alpha - \beta)$  in terms of the sine and cosine of  $\alpha$  and  $\beta$ .
  - (b) Make a table of sine and cosine for  $\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$ .
  - (c) What is  $\cos\left(\frac{\pi}{12}\right)$ ?
2. What is the derivative of  $p(x) = \frac{\sin(x)}{x}$ ?
3. What is the derivative of  $q(x) = \frac{\sqrt{x^2 + 1}}{x}$ ?
4. What is the derivative of  $r(x) = |x|$ ?
5. Find every point on the curve  $y = x^3 + 6x^2 + 12x + 3$  where there is a horizontal tangent line.
6. Find every point on the curve  $x^2 - y^2 = x^3$  where there is a horizontal or vertical tangent line.
7. Write the equation of the tangent line to  $y = \frac{\sin(x)}{\sqrt{1-x^2}}$  at the origin.
8. Consider the function  $f(t) = \frac{1}{\sqrt{2\pi}}e^{-(x^2/2)}$ .
  - (a) Calculate  $f'(t)$ .
  - (b) At which points does  $f$  have a horizontal tangent line?
  - (c) Sketch a graph of  $f(t)$ .