Math 131 - September 29, 2014

Warm-up Problems

1. If $s(t) = 4t^3 + 3t^2 - 270t$ is position, in feet (t in seconds):
   (a) Find every time that acceleration is zero.
   (b) Identify regions where acceleration is postive and acceleration is negative.
   (c) Find every time when velocity is zero.
   (d) Identify regions where velocity is postive and when velocity is negative.
   (e) Identify when position is zero, positive and negative.
2. What is the trigonometric formula for the following:
   (a) $\sin(A + B) =$
   (b) $\cos(A + B) =$

Lecture Problems

3. Using $\frac{d}{dx}(\sin x) = \cos x$ and $\frac{d}{dx}(\cos x) = -\sin x$ find the following, using our derivative rules:
   (a) $\frac{d}{dt}(\tan x) =$
   (b) $\frac{d}{dt}(\cot x) =$
   (c) $\frac{d}{dt}(\sec x) =$
   (d) $\frac{d}{dt}(\csc x) =$
   (e) $\frac{d}{dt}\left(\tan^2 x\right) =$
   (f) $\frac{d}{dt}(\tan x \cot x) =$
   (g) $\frac{d}{dt}\left(x^2 \sin x\right) =$
   (h) $\frac{d}{dt}\left(\frac{\sin x}{1 + \cos x}\right) =$
4. Find the equation of the tangent line of:
   (a) $y = \sin x$ at $x = 0$
   (b) $y = \cos x$ at $x = 0$
   (c) $y = \sin x$ at $x = \pi/4$
   (d) $y = \cos x$ at $x = \pi/4$
   (e) $y = \tan x$ at $x = \pi/4$