

ASSIGNMENT 13

More practice with trig functions

Reading: Sections 2.6 and 2.8 of Smith–Minton

Basic examples

- $\frac{d}{dt} [\cos (\ln t)]$
- $\frac{d}{dt} [\tan t]$
- $\frac{d}{dt} [\tan (t^2)]$
- $\frac{d}{dt} [e^{\sin t}]$

Understanding the cosine function

- Basic form: $f(t) = A \cos (\omega t + \delta)$.
- What are the roles of A , ω , δ ? How do they affect the plot and the plot of the derivative?
- Can you choose A , ω , δ to fit certain desired features?

Fun examples

- Lighthouse problem
- Watching Paul toss eraser
- Watching the merry-go-round

Exercise 13.1. Complete problems 1, 2, 5, 7, 11, 13, 14 in Section 2.6 of Smith–Minton

Exercise 13.2. Complete problems 29, 30, 31 in Section 2.8 of Smith–Minton

Exercise 13.3. Suppose we are watching a balloon drift straight upward. We are standing 10 feet from the place where the balloon was released.

- If the height of the balloon is given by the function $h(t)$ find a formula for rate at which the angle we look at is changing.
- Now suppose that when the balloon is 40 feet high that it is traveling upward at 25 feet per minute. How fast is the angle changing at that time?