Problem set for discussions Week 9
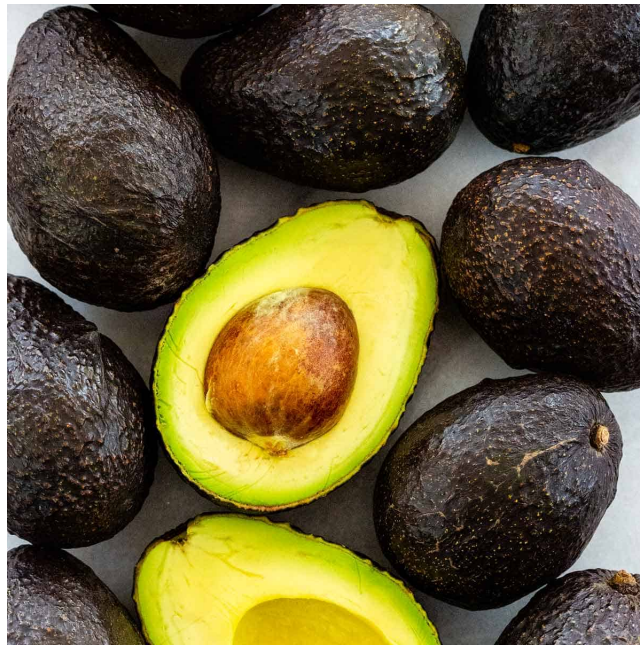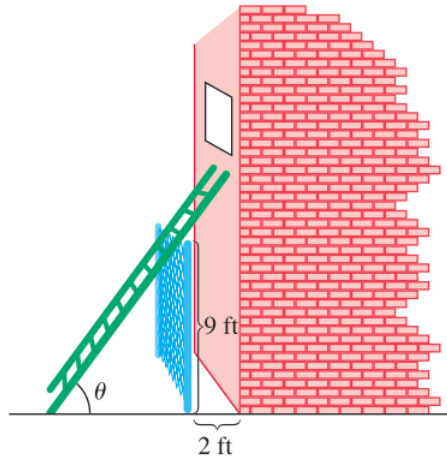# Computing Trig Derivatives

October 20th

Figure 1: Avacado

Group 1

Mundgus Fletcher tries to enter a building by placing a ladder over a 9-ft-high fence so it rests against the building, which is 2 ft back from the fence (see figure). What is the length of the shortest ladder that can be used?

9 ft

2 ft

Group 2

A niffler moves along a straight line. The distance of the niffler from the origin at time t is given by

$$s(t) = \sin t + 2 \cos t$$

Find the velocity at the following times. $t = 0, t = \pi/4, t = 3\pi/2$.

Find the acceleratation at the following times: $t = 0, t = \pi/4, t = \pi$

Group 3

Compute:

$$\lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x$$

Group 4

Consider

$$f(t) = \frac{4t}{3t^2 + 27}$$

on what intervals is f increasing? On what intervals is it decreasing?

Group 5

The number of people $P(t)$ infected by spattergroit after t days is approximated by

$$P(t) = \frac{10 \log(0.19t + 1)}{0.19t + 1}$$

When will the number of people infected start to decline?

1 Extra Problems

1. Compute $\frac{d}{dx} \cot(x)$ (hint: use the quotient rule)

2. Compute:

$$\lim_{x \to 0} \frac{\log(x + 1)}{x}$$

3. Find the derivative of $y = \frac{\tan x}{x-1}$