In-class FRQs

3. The continuous function f is defined on the closed interval −6 <= x <= 5. The figure above shows a portion of the graph of f, consisting of two line segments and a quarter of a circle centered at the point (5, 3). It is known that the point (3, 3 − √5) is on the graph of f.

a. If ∫[-6, 5] f(x) dx = 7, find the value of ∫[-6, -2] f(x) dx. Show the work that leads to your answer.

slope of -2 <= x <= 0: -1
height at x = -2: 1
height at x = -6: 5
average height: 3
x-distance: 4
∫[-6, -2] f(x) dx = 12

b. Evaluate ∫[3, 5] (2f'(x) + 4) dx.

∫[3, 5] (2f'(x) + 4) dx = [2f(x) + 4x][3, 5]
(2f(5) + 4(5)) - (2f(3) + 4(3))
0 - ((6 - 2√5) + 12)
-13.53

c. The function g is given by g(x) = ∫[-2, x] f(t) dt. Find the absolute maximum value of g on the interval -2 <= x <= 5. Justify your answer.

d. find lim[x->1] (10^x - 3f'(x)) / (f(x) - arctan(x))

(10^(1) - 3f'(1)) / (f(1) - arctan(1))
(10 - 6) / (1 - π/4)
4 / (4 - π)/4
16 / (4 - π)