1. (3 pts) In the following sub-problems, Use the Second Fundamental Theorem of Calculus to evaluate each definite integral.

a) \[ \int_1^3 \frac{2}{t^2} dt \]

b) \[ \int_1^3 (3x^3 - 2x^2 + x - 7) dx \]

c) \[ \int_{-1}^x (t + |t|) dt \]

for \( x < 0 \)

2. (3 pts) In the following sub-problems, find the average value of the given function on the given interval.

a) \[ f(x) = \frac{x}{\sqrt{x^2 + 16}} \]

; \([0, 3]\)
b) \[ f(x) = 2 + |x| \]
; \([-2, 1]\).

c) \[ f(x) = \cos(x) \]
; \([0, \pi]\)

3. (2 pts) Find
\[ \lim_{x \to 1} \frac{1}{x - 1} \int_1^x \frac{1 + t}{2 + t} dt \]

4. (2 pts) Use the method of substitution to find the following indefinite integral.
\[ \int_{-\pi/2}^{\pi/2} \cos(x) \cos(\pi \sin(x)) dx \]