

MATH 145 Calculus for Engineering and Science I

Recitation 7

December 2th, 2025

1. Evaluate the following integral without any computations

1. $\int_{-1}^1 x^3 \sqrt{1-x^2} dx$

2. Prove that

$$\int_0^x \frac{\sin t}{t+1} dt > 0, \quad \forall x > 0$$

3. Find the areas of the regions bounded by

1. the graphs of $f(x) = x^2$ and $g(x) = -x^2$ and the vertical lines through $(-1, 0)$ and $(1, 0)$.

2. the graphs of $f(x) = x^2$ and $g(x) = 1 - x^2$

4. Find a function g such that

$$\int_0^x tg(t)dt = x + x^2$$

5. Find $F'(x)$ if $F(x) = \int_0^x xf(x)dt$ (The answer is not $xf(x)$!).