

# MATH 145 Calculus for Engineering and Science I

## Recitation 5

November 17th, 2025

1. Find  $f''(x)$  if
  1.  $f(x) = x^5$
  2.  $f'(x) = x^4$
  3.  $f(x + 3) = x^5$
2. Prove that if  $f(x) = 1/x^2$ , then  $f'(a) = -2/a^3$  for  $a \neq 0$ .
3. Find  $f'(0)$  if  $f(x) = g(x) \sin(1/x)$  for  $x \neq 0$  and  $f(x) = 0$  for  $x = 0$  with  $g(0) = g'(0) = 0$ .
4. The area between two varying concentric circles is at all times  $9\pi \text{ m}^2$ . The rate of change of the area of the larger circle is  $10\pi \text{ m}^2/\text{sec}$ . How fast is the circumference of the smaller circle changing when it has area  $16\pi \text{ m}^2$ ?