MATH 7A
Summer 2022
Group Activity 2

Use the limit definition of the derivative to compute $f'(x)$ given

$$f(x) = \frac{1}{x^7}.$$

Hint: In order to compute $f(x+h)$, you will need to expand $(x+h)^7$ in the denominator of $f(x+h)$, which means you will need to apply the Binomial Theorem

$$(a+b)^n = \binom{n}{0}a^0b^n + \binom{n}{1}a^1b^{n-1} + \binom{n}{2}a^2b^{n-2} + \cdots + \binom{n}{n-1}a^{n-1}b^1 + \binom{n}{n}a^0b^n,$$

where

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

is called the binomial coefficient and

$$n! = n(n-1)(n-2)\cdots 3 \cdot 2 \cdot 1$$

denotes the factorial of n.