Math 253
Spring 2021

Name: Key

Quiz 5.1

1. (5 points) Find a quadratic polynomial, $g(x)$, which passes through the same point and has the same first and second derivative as $\ln(1-x)$ at $x=0$.

$g(x) = ax^2 + bx + c$

$g'(x) = 2ax + b$

$g''(x) = 2a$

$\ln(1-x)$

$\frac{-1}{1-x} = -(1-x)^{-1}$

$\frac{-1}{(1-x)^2}$

$x = 0$

$c = \ln(1) = 0$

$b = \frac{-1}{1-0} = -1$

$2a = -1 \rightarrow a = -\frac{1}{2}$

$\rightarrow \boxed{g(x) = -\frac{1}{2}x^2 - x}$

2. (5 points) Write the following sequence in explicit and recursive form:

$$\{4, 9, 14, 19, 24, \dots\}$$

Explicit: $a_n = 4 + 5n$ for $n \geq 0$

Recursive: $a_0 = 4$

$a_{n+1} = a_n + 5$